

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—21ST YEAR.

SYDNEY, SATURDAY, JULY 21, 1934.

No. 3.

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—	PAGE.	ABSTRACTS FROM CURRENT MEDICAL LITERATURE—	PAGE.
"Clinical Diagnosis and Post Mortem Findings in Malignant Disease", by J. B. CLELAND, M.D.	65	Pædiatrics	84
"The Use of Radon at the Adelaide Hospital", by B. S. HANSON, M.B., B.S. .. .	71	Orthopædic Surgery .. .	85
"The Venoms of Some of the Small and Rare Australian Venomous Snakes", by C. H. KELLAWAY, M.C., M.D., M.S., F.R.C.P. .. .	74	PUBLIC HEALTH—	
		Canberra Cancer Conference .. .	86
REPORTS OF CASES—		UNIVERSITY INTELLIGENCE—	
"Thrombosis of the Cranial Venous Sinuses following a Mild Infection of the Naso-Pharynx", by RAYMOND T. BINNS, M.B., B.S. .. .	78	The University of Sydney .. .	101
REVIEWS—		OBITUARY—	
Diathermy .. .	80	James Fisher Anderson .. .	101
A Book on Volumetric Analysis .. .	80	CORRESPONDENCE—	
LEADING ARTICLES—		The Surgical Treatment of Ascites .. .	102
The Fifth Australian Cancer Conference .. .	81	"Acute Rheumatism" or "Rheumatic Fever" .. .	102
CURRENT COMMENT—		Treatment of Cancer of the Lip .. .	103
The Use of Abdominal Supports in Thoracic Disease .. .	82	NOTICE .. .	104
Granulopenia .. .	83	DIARY FOR THE MONTH .. .	104
		MEDICAL APPOINTMENTS VACANT, ETC. .. .	104
		MEDICAL APPOINTMENTS: IMPORTANT NOTICE	104
		EDITORIAL NOTICES .. .	104

CLINICAL DIAGNOSIS AND POST MORTEM FINDINGS IN MALIGNANT DISEASE.¹

By J. B. CLELAND, M.D.,

Marks Professor of Pathology, University of Adelaide;
Honorary Pathologist, Adelaide Hospital.

At the Adelaide Hospital it is the custom for the pathologist to receive what is called a request card, asking him to make a *post mortem* examination, the request card being signed on the back by some relative of the deceased. On the front of the request card there is a summary of the more important clinical features of the case and the final diagnosis that has been made. This final diagnosis is meant to represent the disease that would appear in the death certificate as the cause of death; and, as it is written in before the *post mortem* examination is made, there is a ready means of assessing the correctness of such clinical diagnosis. After the

post mortem examination the real cause of the individual's death is inserted and an entry is made indicating whether the *ante mortem* diagnosis was correct, or reasonably correct, was partially in error, or was more or less completely wrong. The card also indicates how long the patient has been in hospital, so that patients coming in moribund and dying without any proper diagnosis having been made can be readily separated from the others.

A grand total of 1,347 such cards was examined, and from this total 212 cases in which a malignant growth was found at the *post mortem* examination have been abstracted for more detailed consideration. In addition to these there were 38 cards indicating that malignant disease was suspected, but this was not found to be present. These have also been analysed, giving a total of 250.

The total number of cases in which there was no malignant disease was 1,135.

At the end of this article the results have been tabulated under three headings, namely: (i) Cases in which malignant disease was suspected or diagnosed

¹ Read at the Fifth Australian Cancer Conference, Canberra, April, 1934.

and found to be present; (ii) cases in which it was present but was not suspected; and (iii) cases in which it was suspected but not present. It will be seen that out of the 212 malignant cases, in 20% the malignancy was not suspected, but this is nearly offset by the number of cases in which malignancy was diagnosed or suspected and was found to be absent.

Under the first heading, malignant disease suspected or diagnosed and found to be present, are included all cases in which a diagnosis of malignant disease was made even though the malignancy might be in some adjacent or even more distant organ than that indicated. So that the 80% in which the diagnosis was correct so far as the presence of malignant disease was concerned includes a number of cases of incorrect diagnosis of the actual primary site. These have not been worked out in tabular form, but are indicated in the summaries under the various local headings.

It will be noted that in accessible parts the diagnoses are satisfactorily correct. In the diagnosis of malignant disease in deeper parts the clinical error must necessarily be fairly great, though in general for statistical purposes it will be seen that the unsuspected malignant cases are offset by those thought to be malignant and found not to be so. In the case of the stomach, of the colon and of the caecum, and of abdominal carcinomata too extensive for the origin to be ascertained, it will be seen that the instances in which malignancy was suspected and not present are quite definitely greater than those where malignancy was present and not suspected. This suggests that our vital statistics are somewhat overloaded as to the liability of the community to carcinomata of these parts.

The other two regions in which errors are not infrequent are growths in the lungs, mediastinum *et cetera* and tumours of the brain; in both of these the unsuspected malignant cases are balanced by those which are thought to be malignant and are found not to be so.

It has seemed of value to discuss the results under the particular headings to which they belong, as this may be of value to the physician or surgeon as showing in what circumstances mistakes may be made.

Carcinoma of the Stomach.

Carcinoma of the stomach was correctly diagnosed or suspected in thirty-one cases. In several cases a terminal pneumonia was not diagnosed. In one case death was due to gangrenous appendicitis, and not to the carcinoma. In one, hydatid of the liver was not suspected. In one there was a membranous proctitis which was not detected. One patient had a chronic nephritis. In one case in which sudden death had occurred and in which massive pulmonary embolism was suspected, no embolism was found, but there was fibrosis and malignant infiltration in and around both suprarenal glands.

In six cases the carcinoma of the stomach was thought to be carcinoma of some adjacent part. In two cases in which carcinoma of the oesophagus was suspected, the growth was found to be in the

stomach at the cardiac orifice. In one case the growth was thought to be in the colon. In one case the diagnosis was carcinoma or cirrhosis of the liver. In one case the symptoms were dependent on secondary deposits in the skull and *dura mater*, the source (in the stomach) not being detected. In one case the cause of death was carcinoma of the palate with secondary deposits, the patient being found to have a separate carcinoma of the stomach.

In one case, diagnosed as carcinoma of the stomach, melanomatous deposits were found in the liver and melanotic ulcers in the stomach and intestines.

Carcinoma of the stomach was present but not suspected in two cases: One patient, in hospital six days, had a chronic ulcer of the stomach, with a malignant edge, from which there had been hæmorrhage, the diagnosis made being one of ulcerative colitis. One patient, under observation seven days with a necrotic condition of the descending colon, as well as carcinoma of the stomach, had been diagnosed as suffering from tuberculous peritonitis.

Carcinoma of the stomach was diagnosed or suspected, but was not found at autopsy, in ten cases. In three of these, however, carcinoma of the stomach would probably not have appeared on the death certificate. One patient had irregular pneumonic consolidation and a dilated right heart; he was under observation for eleven days. One patient had organization in the lower lobe of the left lung and hypostatic pneumonia in the right lung; he had been under observation for six days. One patient had a chronic duodenal ulcer; he was under observation for fourteen days. One patient, under observation for one month, with a diagnosis of post influenza pneumonia with what was thought possibly to be a gastric neoplasm, was found to have a large degenerated hydatid cyst of the liver, with pressure on the right suprarenal gland. One patient, under observation for fifteen days, had hydro-nephrosis, which had been diagnosed, renal insufficiency and bronchopneumonia. One patient, under observation one day, had pyonephrosis, perinephritis and uræmia. One patient, under observation eleven days, had cystitis, which was diagnosed, surgical kidneys and some pulmonary tuberculosis. One patient, under observation one day, died from Richter's hernia. One patient, under observation two days, had apparently pernicious anæmia and bronchopneumonia. One patient, under observation five days, died from angina and had atheroma of the coronary vessels.

Thus in 50 cases carcinoma of the stomach was present in 39. Carcinoma of the stomach was correctly diagnosed or suspected in 31 patients, of whom six had important lesions elsewhere unsuspected. It was suspected elsewhere or made as an alternative diagnosis in six instances. It was quite unsuspected in two cases. Melanomata of the liver, stomach and intestine was diagnosed as carcinoma of the stomach in one case.

Carcinoma of the stomach was diagnosed or suspected wrongly in ten cases. In three of these cases this diagnosis would not have appeared on the death certificate. Three of the patients were in hospital for only one or two days.

Carcinoma of the Colon or Caecum.

Among ten cases in which malignant disease of the colon or caecum was suspected, the site was correctly diagnosed or suspected in seven, and was thought to be in the stomach in the other three cases. In one of the seven cases a huge secondary ilio-psoas abscess was not recognized.

Carcinomata were present but not suspected in five cases. These comprised: (i) A non-diagnosable early carcinoma of the ascending colon, death being due to coronary disease. (ii) A carcinoma diagnosed as diverticulitis, death occurring on the day of the patient's admission to hospital. (iii) A carcinoma diagnosed as diverticulitis with abscess formation. In this instance two carcinomata of the sigmoid flexure were found, the patient dying after eighteen days of observation from massive pulmonary embolism (correctly suspected). (iv) A carcinoma diagnosed as chronic rheumatoid arthritis of both hip joints and periostitis of the shaft of the left femur, the autopsy showing carcinoma of the ascending colon with deposits in the liver, the femur, and above the left clavicle; the patient was under observation for two months. (v) A carcinoma diagnosed as lobar pneumonia. A carcinoma of the splenic flexure and necrosis of the mucosa of the colon was found, but the patient was under observation for only one day.

Carcinoma of the colon was diagnosed or suspected, but not present in eight cases, namely: (i) Carcinoma of the sigmoid was suspected, but a leaking abdominal aneurysm with a hematoma was found; the patient was under observation for seven days. (ii) Carcinoma of the ascending colon was suspected, but another leaking abdominal aneurysm with retroperitoneal hemorrhage was found; death occurred on the day of the patient's admission to hospital. (iii) Intestinal obstruction over an adhesion; the patient was under observation for one day. (iv) Non-malignant stricture of the rectum, death occurring on the day of the patient's admission to hospital. (v) Perinephritic abscess, abscess in the kidney and septic bronchopneumonia; the patient was under observation for two days. (vi) A case diagnosed as carcinoma of the bowel and uterus, but found to be a ruptured diverticulum in the broad ligament; the patient was under observation for three days. (vii) Chronic interstitial nephritis, cystitis, ulcerative colitis and aspiration pneumonia; the patient was under observation for twelve days. (viii) Pulmonary tuberculosis, hydrops of the gall-bladder and senile atrophy; the patient was under observation for two days.

Carcinoma of the Rectum.

Malignant disease was suspected or diagnosed in six cases, the site being correct in three. The remaining three comprised: (i) A case diagnosed as probable malignant disease of the prostate with deposits in the spine, the spinal symptoms being probably due to peripheral neuritis; the patient was under observation for five and a half weeks. (ii) A case diagnosed as carcinoma of the uterus with secondary intestinal obstruction; the patient was under observation for five weeks. (iii) A case

diagnosed as secondary deposits in the liver or tuberculous peritonitis; the patient was under observation for three weeks.

Carcinoma of the rectum was present but not suspected in one case. The patient was a boy of seventeen and a half years of age who had pain in the appendiceal region and was under observation for only one day.

Carcinoma of the rectum was diagnosed but not present in one case. In this instance the patient was known to have pulmonary tuberculosis and "a carcinoma of the rectum was found invading the skin", but at the autopsy, though tuberculosis and amyloid disease were present, no carcinoma of the rectum was found; the patient was under observation for eight days.

Carcinoma of the Pancreas.

Malignant disease of the pancreas was suspected or diagnosed in nine cases; in four the pancreas was suspected, and in four others the stomach. In the remaining case with cerebral softening (in which a secondary deposit was suspected) and abdominal symptoms, autopsy revealed a large carcinoma in the tail of the pancreas, splenic flexure, stomach, spleen *et cetera*.

Carcinoma of the pancreas was present, but not suspected, in three cases, namely: (i) A case diagnosed as cirrhosis of the liver and secondary anaemia, but carcinoma of the pancreas, invasion of the kidney and deposits in the liver were discovered; the patient was under observation for five weeks. (ii) A case without a diagnosis, but with the blood picture of pernicious anaemia, though the patient did not respond to liver diet, the spleen and liver being palpable. The autopsy revealed carcinoma of the pancreas with deposits in the glands and liver and bronchopneumonia. The patient was under observation for four months. (iii) A case diagnosed as possible cirrhosis of the liver with jaundice; carcinoma of the head of the pancreas and secondary deposits in the liver and peritoneum were found; the patient was under observation for two months.

Carcinomata Probably Originating in the Liver.

In two cases it was thought that carcinoma probably originated in the liver. In one this was thought to be a probable pulmonary neoplasm, but the patient was found to have a large solid carcinoma in the liver, extensive carcinomatous peritonitis and infiltration of the mediastinum; he was under observation for seventeen days. The other was diagnosed as secondary malignant disease, abdominal involvement evidently being meant. The patient died on the day of admission to hospital. In one instance carcinoma of the liver was diagnosed but not present, the patient having suppurative pericarditis, hydrothorax and nutmeg liver, and being under observation for two months.

Carcinoma Probably Originating in the Gall-Bladder.

Malignant disease, probably originating in the gall-bladder, was diagnosed or suspected in five cases. In one of these there was a palpable mass in the lower part of the abdomen; and the other four

were diagnosed as carcinoma of the stomach, either definite or suspected. In one case carcinoma of the gall-bladder was present, but not suspected, the patient being deeply jaundiced with a large hard liver and having developed a "stroke" five days before admission to hospital, the autopsy showing carcinoma of the gall-bladder and subacute malignant endocarditis with embolic cerebral softening. The patient was under observation for twelve days.

Carcinoma of the Common Bile Duct.

Malignant disease was suspected or diagnosed in three cases, two of these being thought to be carcinomata of the head of the pancreas and the other carcinoma of the stomach.

Abdominal Carcinoma Present, Origin Not Determined.

There were five cases in which malignant disease was suspected or diagnosed, the details being as follows: (i) Carcinoma of the stomach was suspected, but a carcinoma was found surrounding the third part of the duodenum; secondary anaemia was present. (ii) Carcinoma of the stomach was suspected, but only a carcinomatous mass in the mesentery was found. (iii) Carcinoma of the liver was diagnosed and deposits were found *post mortem*, but the origin was not detected. (iv) Carcinoma of the gall-bladder or pancreas was diagnosed and masses were found affecting these organs and the liver. (v) Carcinomatous cysts in the liver were found at operation, these being possibly secondary to a mammary cancer, the breast having been removed.

Abdominal carcinoma was found present, but was not diagnosed or suspected in two cases, as follows: (i) The patient was weak and anæmic and died suddenly, and was found to have a chronic gastric ulcer and also malignant deposits in the liver of unknown origin; he was under observation for two days. (ii) Cardiac failure and fibrillation were diagnosed and atrophic cirrhosis of the liver with cancerous peritonitis (possibly from the gall-bladder) was found, the patient dying on the day of admission to hospital.

In three cases the diagnosis of an abdominal neoplasm was not confirmed. These consisted of: (i) A case diagnosed as abdominal malignant disease or cirrhosis of the liver, and slight unilobular cirrhosis of the liver with hemosiderin deposit was found. (ii) A case diagnosed as alimentary carcinoma; great emaciation attributed to mental disease, brown atrophy of the heart and some pneumonia were found. The patient was under observation for eleven days. (iii) A case diagnosed as possible abdominal neoplasm; a foul chronic ovarian abscess and extensive amyloid disease were found; the patient was under observation for four months.

Origin Unknown, but Malignant Disease Diagnosed.

In one case a diagnosis of gastric carcinoma was made. Diffuse malignant infiltration by mucin-forming carcinoma cells in the pleura, peritoneum and glands of the neck was found, but no tumour mass was present, and the site of origin was not detected. There was a simple chronic gastric ulcer.

Cancer of the Oesophagus.

In ten cases malignant disease of the oesophagus was diagnosed or suspected. In seven the oesophagus was diagnosed correctly as the site of origin. In one in which the growth was in the upper end the diagnosis was cancer of the larynx. In one case diagnosed as possible cancer of the stomach there was a squamous epithelioma of the oesophagus and hypertrophy of the pylorus (possibly from achalasia). One case in which the possibility of malignant disease was suspected, carcinoma of the lower end of the oesophagus and cardiac end of the stomach and an abscess in the lung were found. In one case of cancer of the oesophagus was not diagnosed, the patient having cerebral symptoms due to an abscess which was secondary to abscesses in the lung, which themselves were due to a fungating cancer of the oesophagus.

Cancer of the Larynx and Epiglottis.

Three cases of cancer of the larynx and epiglottis were correctly diagnosed. In another case diagnosed as possible acute tuberculous laryngitis, the patient had cancer of the arytenoid cartilage and broncho-pneumonia. In one case diagnosed as laryngeal growth or asthma there was an aneurysm bulging into the trachea, and some pneumonia; the patient was under observation for thirteen days.

Carcinoma of the Tongue, Lip, Floor of the Mouth, Neck et cetera.

Nine cases of carcinoma of the tongue, lip, floor of the mouth, neck et cetera were diagnosed correctly. In some the malignancy was under control, and one patient died from pulmonary tuberculosis; one died from meningitis with infection of the middle ear. One other patient died from ordinary uræmia, one from anuria, one from an infected granulating wound, one from hæmorrhage from an acute gastric ulcer, one from heart failure during anaesthesia, and two from shock and hæmorrhage. One patient whose condition was diagnosed as possible gastric ulcer had a growth of the right tonsil and hæmorrhage of the tissues; he was under observation for four days.

Carcinoma of the Thyroid.

There were only two cases of carcinoma of the thyroid; one was recognized before death as originating in the thyroid; in the other, in which at autopsy a thyroid origin seemed the most likely, glands in the neck were recorded as malignant.

Squamous Epithelioma of Doubtful Origin.

One patient with weakness, moderate pyrexia and left pleural effusion, had large squamous epitheliomatous deposits in the tail of the pancreas and liver, as well as a left empyema and compressed lung. The origin of the squamous epithelioma is unknown.

Renal Cancer.

Of four examples of carcinoma of the kidney, a Grawitz tumour was correctly diagnosed; one case was diagnosed as carcinoma of undetermined origin with metastases in the liver; in one case secondary carcinoma infiltrating the buttock was diagnosed;

and in the fourth, double pyonephrosis was suspected and found, and there was also a neoplasm in the left kidney which was not suspected.

Cancer of the Bladder.

In two cases malignant disease of the bladder was diagnosed. In one of these the site was correct, and in the other a mass was felt in the right pelvic region causing intestinal obstruction which was found to be due to an extension of the growth around the rectum.

In three cases malignant disease was not suspected, one being diagnosed as an enlarged prostate, and two as acute nephritis from the development of symptoms resulting from the secondary pyonephrosis or hydro-nephrosis. In another case, diagnosed as anuria and uræmia probably from renal calculus, there was carcinomatous infiltration in the pelvis, but the origin of the growth was not determined.

Epithelioma of the Penis.

One case of epithelioma of the penis was correctly diagnosed.

Carcinoma of the Prostate.

Two cases of carcinoma of the prostate were correctly diagnosed. In another case, probably originating in the prostate and showing deposits in the mesentery, along the abdominal aorta and in the groins, malignant disease was diagnosed.

In two cases the malignancy was not recognized. In one case the patient, who was in hospital for fifteen days, had been knocked down by a motor car and then developed pyelonephritis and uræmia. In the other case the patient was in hospital for three weeks, syringomyelia was suspected, and a secondary deposit in the dorsal part of the spine was found.

In one case a malignant prostate was diagnosed, but not confirmed at autopsy.

Female Generative Organs.

An epithelioma of the vagina was correctly diagnosed.

A case diagnosed as carcinoma of the vagina was found to originate in the urethra.

Of two examples of carcinoma of the *cervix uteri*, one was correctly diagnosed. In the other the patient was found unconscious and died on the day of admission to hospital from, it was thought, cerebral hæmorrhage, but the autopsy showed chronic nephritis with uræmia and cancer of the cervix.

In two cases of carcinoma of the body of the uterus one death followed panhysterectomy, and in the other case the patient, in hospital for nine days, had a diffuse atypical pneumonia (the diagnosis being bronchopneumonia) and an unsuspected carcinoma of the uterine body.

Two patients had bilateral malignant ovarian growths, one case being diagnosed and the other suspected.

Carcinoma of the Breast.

Seven patients with carcinoma of the breast, dying usually from the effects of deposits elsewhere or occasionally from a merciful pneumonia, presented no

difficulties in the diagnosis of the malignancy. One patient died from what appeared clinically to be tetanus. An exploratory incision for diagnostic section purposes had been made, but no cultural evidence of tetanus infection was obtained from this site at the autopsy, though it was thought that in the mass of malignant ulceration elsewhere a focus of tetanus infection probably existed.

Malignant Growths of the Lungs, Mediastinum and Pleura.

Two cases of endothelioma or probable endothelioma, affecting the pleura and extending to other regions, were correctly recognized before death.

In five cases of malignant disease, mostly carcinomata, in which a lung origin seemed definite or probable, the lungs or pleura were suspected in three, the stomach in one (there were deposits in the liver and brain), and the liver in one (deposits in the liver, spleen and kidneys).

In six cases in which there were malignant growths, probably primary, in the lung, malignancy was not suspected, or at any rate not seriously entertained. These comprise the following: (i) Obstruction to the right bronchus with right heart failure (diagnosed) due to a carcinoma behind the lower division of the right bronchus, and an independent angio-myxo-sarcomatous mass near the pancreas. The patient was under observation for two and a half months. In this case malignancy was doubtless suspected more than the request submitted indicates. (ii) A patient, admitted to hospital with hæmoptysis, who developed symptoms suggestive of cerebral thrombosis. The autopsy showed carcinoma of the left lung with deposits in the brain and liver. The patient was under observation for two and a half months. (iii) An enlarged prostate with cystitis, chronic nephritis and uræmia, from which the patient died. A neoplasm containing cartilage and epithelial-lined spaces was found accidentally in the left lung near a bronchus. The patient was under observation for one month. (iv) A patient was under observation for two days with pneumothorax (cause not diagnosed) and heart failure. In addition to pneumothorax and interstitial emphysema there was found a malignant mass round the left bronchus, with deposits in a rib and in the ovaries. (v) A patient was under observation for two days with mental symptoms and with a history of cough and right-sided pleurisy with effusion. There was a carcinoma of the lung and malignant endocarditis, the latter being responsible for an area of cerebral softening by infarction. (vi) A case diagnosed as bronchiectasis and emphysema. Autopsy revealed a carcinoma of the bronchus and secondary empyema. The patient was under observation for eleven days.

There were four cases in which malignant growths of the lung or mediastinum were suspected or diagnosed, but were not found: (i) A patient was under observation for five weeks with a "benign stricture of the œsophagus, cough and loss of weight, consolidation of the lower part of the left lung and a pleural fluid suggesting a new growth". These symptoms gave rise to a diagnosis of carcinoma of the lung. The patient was found to have had an infarction in the lung, with pleuritic effusion and an

hypertrophied and dilated heart. (ii) A patient under observation for two months, with pain and swelling in the joints and blood-stained left pleural effusion, leading to the suspicion of carcinoma of the lung, was found to have a prevertebral abscess secondary to caries of a cervical vertebra and a collapsed organized lung. (iii) A patient, admitted to hospital unconscious and dying next day with the heart displaced to the left and signs of compression of the lungs, suggesting the presence of a mediastinal tumour, was found to have died from uræmia from bilateral hydronephrosis and to have an unresolved pneumonia. (iv) A patient, whose leg had been amputated for sarcoma four months previously, was readmitted to hospital with shortness of breath, signs in both lungs and pleural effusion, which naturally suggested secondary deposits. Death occurred after three weeks, and autopsy revealed only chronic bronchitis and emphysema, with an hypertrophied and dilated heart.

One case was correctly diagnosed as a mediastinal new growth. A case, diagnosed as carcinoma of the lung, proved to be a lymphosarcoma invading the lung. A supposed lymphosarcoma with mediastinal deposits proved to be leucæmia with glandular enlargement in the mediastinum and along the abdominal aorta.

Suprarenal Glands.

There were two cases in which there were bilateral masses in the sites of the suprarenal glands. In one of these, with multiple hæmorrhagic nodules, malignancy was recognized, though the site of origin was unknown. In the other case the patient, who was under observation for one month, had been admitted to hospital with acute pharyngitis, had developed a rash and double *otitis media* and right facial paralysis, and had been treated outside for probable pulmonary tuberculosis, pneumonia causing death. At the autopsy, in addition to pneumonia, there were very large neoplastic growths in the suprarenal glands.

Origin of the Malignant Cells Unknown.

A woman, under observation for one month with difficulty in swallowing solids for seven months, loss of voice for seven weeks, and difficulty in swallowing fluids for four days, the latter symptom suggesting tetanus (which may have been present and may have caused death), gave rise to the suggestion of carcinoma of the larynx or œsophagus. In spite of careful search, no primary growth could be detected, but the patient had hard, but not enlarged, carcinomatous glands in the neck, the mediastinum and near the pancreas.

Intracranial Neoplasms.

Gliomata as cerebral or cerebellar tumours were correctly diagnosed or suspected in sixteen cases. In another case a cyst that had been tapped proved to be softening and hæmorrhage in a giant-celled glioma. A diagnosis of possible encephalitis was made in a glioma of the right frontal lobe, and of cerebral thrombosis in a glioma of the basal nuclei, and in one of the *corpus callosum*. A patient with

left hemiplegia who gave no response to the Wassermann test had a glioma in the right motor area.

A patient with a cerebral tumour, thought to be probably a glioma, was found to have a deposit in the brain, with malignant masses in the neck, mediastinum, left suprarenal gland and left kidney. Another patient, believed to have a glioma, had multiple melanotic deposits in the brain.

A man, admitted to hospital having epileptic fits and dying the same day from *status epilepticus*, was found to have a seminoma of the testis and a deposit with hæmorrhage in the brain. A woman, under observation for nine days with cranial nerve palsies and who was thought to be suffering possibly from an aberrant form of poliomyelitis, had a carcinoma with hæmorrhagic deposits in the ovary, liver, tracheal glands and middle fossa of the skull.

Six cases, in which a cerebral tumour was diagnosed or suspected but was not found, presented the following features: (i) A cyst of the chorioid plexus blocking the foramen of Munro. The patient suffered from headache, vomiting and optic neuritis; he was unsteady on his feet. His leucocyte count was 14,000 per cubic millimetre. The autopsy result hardly seems to explain these satisfactorily. (ii) The autopsy diagnosis was obscure, senile dementia was suggested. The patient had difficulty in walking and frequent falls, his memory was failing, he had an ataxic gait and coma. (iii) Cerebral softening from vascular occlusion. The patient had left hemiplegia, then fits starting on the left side of the face. (iv) *Pachymeningitis hæmorrhagica*. The patient had gradual blindness for four to five years, headaches and vomiting. Disseminated sclerosis or cerebral tumour was suspected. (v) Capillary hæmorrhages in the pons alone detected at autopsy. The patient had suffered from twitching attacks for some years, followed by violent twitching of the right side of the face; the temperature rose and death occurred. The patient was under observation for three days. (vi) Distension of the ventricular system only found. The patient had headache for two months, pain in the back of the neck and optic neuritis. The cerebrospinal fluid was under increased pressure; the patient was under observation for eight days.

In one case the cerebral tumour proved to be a meningioma. Two cerebello-pontine angle tumours were correctly diagnosed. One patient, whose condition was so diagnosed, and who was operated on, had an aneurysmal dilatation of the anterior superior cerebellar artery occupying the position of such a tumour. Another patient, with this definite diagnosis, had a tuberculoma of the right cerebellar hemisphere.

As regards the pituitary fossa, an acromegalic had a friable eosinophile tumour of the pituitary: a patient with Fröhlich's syndrome had a pituitary tumour with deposits in the mediastinum and heart, and a man operated on, with a diagnosis of pituitary tumour, had a large growth in that fossa. A woman, who finally died from severe hæmoptysis from an aneurysmal dilatation in a chronic abscess cavity in the lung, had been taking thyroid gland regularly, and was thought to have an enlarged pituitary fossa;

the autopsy showed a small pituitary tumour and no thyroid gland substance. A man, who had had squamous epitheliomatous glands removed two years before, in Sydney, from the left side of the neck, had recurrences and was treated with radium; no primary growth had been detected, and autopsy revealed a sub-pituitary carcinoma extending into the neck. A patient who had been operated on by the nasal route for a pituitary tumour and who died from meningitis, showed no tumour or obvious cyst, though the latter might have been unrecognizable after the operative procedure. A patient with neuritis was found to have neuro-fibromata on the *cauda equina*.

Sarcomata.

A sarcoma, a fibro-sarcoma and a lymphosarcoma were all correctly diagnosed as such. A malignant mass, thought to have originated in the ovary, proved to be a huge mixed-cell sarcoma of the kidney. "Malignancy of the spleen" proved to be probably a primary lymphosarcoma of that organ. A woman who had had a growth removed from the uterus sixteen years before and was thought to have carcinomatous glands in the neck, which were treated with radium, had extensive multi-nucleated sarcomatous deposits in the peritoneum, liver, kidneys and lungs.

TABULATION OF RESULTS.

Site or Type.	Malignant Disease Suspected or Diagnosed and Found to be Present.	Malignant Disease Present, Not Suspected.	Malignant Disease Suspected, Not Present.
Stomach	38	2	10
Colon or caecum	10	5	1
Rectum	6	1	—
Pancreas	9	3	—
Liver	2	—	—
Gall-bladder	5	1	—
Bile duct	3	—	—
Abdominal	5	2	3
Origin ?	2	—	—
(Esophagus)	10	1	—
Larynx, epiglottis	3	1	1
Tongue, lip, mouth, neck et cetera	10	—	—
Thyroid	2	—	—
Squamous epithelioma, origin ?	—	1	—
Kidney	3	1	—
Bladder	2	4	—
Penis	1	—	—
Prostate	3	—	1
Female generative organs	6	—	—
Breast	7	—	—
Lungs, mediastinum et cetera	10	6	4
Suprarenal glands	1	1	—
Gliomata	17	4	6
Secondary deposits in brain	2	—	—
Meningioma	1	—	—
Tumour of <i>cauda equina</i>	—	1	—
Cerebello-pontine angle tumours	2	—	2
Tumours of the pituitary fossa	4	—	1
Sarcomata	5	2	—
Melanomata	1	—	—
Totals	170	42	38

A boy of sixteen, under observation for three weeks, with high continued pyrexia of uncertain origin, suggesting glandular fever, Hodgkin's disease

or miliary tuberculosis, was found to have sarcomatous glands along the aorta and in the groin. A woman, under observation for ten weeks, with the diagnosis of osteomyelitis of the pelvic bones, the X ray photographs showing necrosis of the bone, proved to have a retroperitoneal lymphosarcoma with secondary bony changes.

Melanomata.

A malignant melanoma originating in the leg of a girl of nineteen was correctly diagnosed. As mentioned under intracranial neoplasms, melanotic deposits in the brain (the site of origin being unknown) were diagnosed as probably glioma.

Summary.

The total with malignant neoplasms was 212; in 20% of these malignancy was not suspected. This 20% is nearly offset by the number of cases in which malignant disease was diagnosed or suspected, and was found to be absent. The total with no malignancy was 1,135. A grand total of all cases was 1,347. Of these patients 15.7% had malignant disease, and in 3.1% malignant disease was present but not suspected, and in 2.8% it was suspected but not present. The number of instances in which the site or the nature of the malignant tumour was in error is indicated in the details supplied, but has not been separately tabulated.

THE USE OF RADON AT THE ADELAIDE HOSPITAL.¹

By B. S. HANSON, M.B., B.S. (Adelaide),
Radium Registrar, Adelaide Hospital, Adelaide.

The Production and Mounting of Radon.

AFTER the loan of 300 milligrammes of radium bromide to the University of Adelaide in 1930 for the purpose of extracting and purifying radium emanation, a long period ensued in which experiments were carried out with a view to perfecting, or perhaps it would be better to say improving, a method of extraction. Liquid air was deliberately excluded from the process because this commodity would normally be obtained from a commercial firm with the ever-present possibility of irregularity of supply, and it was hoped to make the process self-contained. Thus we first adopted Moran's method, involving sparking the gases, passage over heated copper oxide, and finally through a tube containing phosphorus pentoxide. At this stage the emanation was sealed in a glass capillary and was filtered by a nickel tube of wall thickness 0.4 millimetre. The greatest difficulty was experienced in eliminating sufficient extraneous gases to give a satisfactory concentration, while the concentration also varied from week to week. It was felt that excess hydrogen and water vapour might account for this, and a modification was decided on.

In the second apparatus the gases were sparked as before, but the heated copper oxide spiral was replaced by a heated palladium tube which, of

¹ Read at the Fifth Australian Cancer Conference, Canberra, April, 1934.

course, is permeable to hydrogen. Heating this tube presented some minor technical difficulties, and was responsible for several accidents to the apparatus. On the whole the results were similar to those from the first method, occasionally giving a satisfactory or high concentration, but more often one that was low. Moran's method was shortly afterwards again adopted.

Clinical experience had indicated the necessity of increased screenage, and for a short time the filled glass capillary was sealed within screw-top white gold needles with a wall thickness equivalent to 0.5 millimetre of platinum. Subsequently the radon was sealed in a gold capillary, which was inserted into nickel tubing, also giving filtration equivalent to 0.5 millimetre of platinum. Monel metal was later substituted for the nickel as being softer and more easily drawn.

Approximately at the same time as the gold-nickel needle was first used, we reverted to Moran's method of extraction, with the addition of a U-tube dipped in liquid air. The water vapour and radon were thus frozen out, and the other gases passed on by pressure. On allowing this tube to become warm again, both the frozen materials vapourized and were forced into the gold capillary, and thus water vapour was not excluded.

Absence of reaction in the tissues in which these needles were implanted indicated leakage of radon, and a search was made for the cause of this. At first the method of sterilization by boiling was suspect and ionization measurements before and after boiling showed a rapid loss in activity which tended to confirm us in our suspicion. Thereafter sterilization was carried out by immersion in alcohol, for which chloroform was later substituted as being a more effective bactericide. Two weeks in which satisfactory skin reactions were obtained closely followed this change and gave us cause for hoping that we were on the right track, but then a succession of treatments in which a reaction was not obtained showed that there was something more fundamental at fault. Manometer tests indicated that not infrequently there was a leak from both ends of a filled gold capillary sealed by compression. Tests of purity of the gold were satisfactory, and rounding of the jaws of the pliers did not improve matters, so that we were somewhat reluctantly forced to the conclusion that impurities in the radon, either grease or its products or water vapour, prevented annealing of the gold.

Once again a change was made in the method of purification, the process consisting essentially of sparking, passage of the gases through a tube containing heated metallic calcium, and finally over phosphorus pentoxide. In the nine months that have elapsed since the introduction of this simple method, leakage of radon has been so infrequent as to be negligible, but we still test for it by mounting and measuring the gas on the evening before it is used. Remeasurement on the following morning enables us to estimate whether the loss has been greater than can be accounted for by natural decay.

Drawing the gold and monel tubing is a tedious process which occupies a great deal of the limited

time of the technician at our disposal. As some platinum iridium alloy was readily available, it was decided to try radon mounted in a glass capillary filtered by a platinum tube with a wall thickness of 0.5 millimetre. Each platinum needle is closed at one end, while the open end is bevelled and bored to take a thread, of which the knot acts as a stopper to keep the glass capillary in place. It will be explained later that clinical experience is quite favourable to this type of needle, so that, in view of the large amount of time saved during its preparation, I would be averse to any Australian-wide standardization which excluded the glass-platinum mounting. By adopting such a needle for routine work we do not altogether deprive ourselves of the gold-nickel type, which can always be obtained should longer needles or variable filtration be desirable.

Types of Needle.

It is convenient at this stage to consider the relative advantages and disadvantages of these two types of needle; we are indebted to Mr. A. H. Turner, of the Commonwealth Radium Laboratory, for some suggestions in this respect.

Gold-Nickel Mounting.

The advantages of the gold-nickel mounting are as follows:

1. The length can be varied at will.
2. Filtration can be varied at will.
3. The needle is pliable.
4. The outer nickel sheath is probably useful in stopping the high-speed electrons emitted from the heavy gold tube.
5. The cost of materials is relatively small.

The disadvantages are as follows:

1. An accurate seal is not always obtained.
2. The filtration may unexpectedly vary due to an error in technique.
3. A long time is occupied in drawing the tubing.

Glass-Platinum Technique.

The advantages of the glass-platinum technique are as follows:

1. A perfect seal is obtained.
2. Filtration is constant.
3. Little time is consumed in preparation of the needles.

The disadvantages are:

1. The platinum tubes are used over and over again, so that the needles are static as regards filtration and length.
2. They cannot be bent.
3. Sealing by heat causes movement of the gases to cooler parts of the tube, thereby possibly causing unequal concentrations in various needles.

4. The initial outlay is larger. It has been estimated, however, that a two centimetre needle of this type costs little more than one shilling for the platinum at the present valuation, so that insurance against loss is hardly necessary. The gold must be recovered and more tubing drawn as required, so that, if the cost of labour over a period is considered in addition, it is probable that the platinum tubes are actually cheaper.

Our bulk supply of radium bromide was recently divided between two flasks connected to the purifying apparatus by a three-way tap. Either or both flasks may be exhausted at the one operation; it was thus hoped to escape loss of the whole of the week's supply of radon should an accident occur during extraction.

Clinical Application.

In all of the interstitial radon treatments carried out at the Adelaide Hospital we have used threaded needles which are withdrawn at the end of a pre-determined period. Permanent implants have not been used for three reasons: (i) There was early difficulty in sealing the gold tubing. (ii) The filtration of a "seed" is considerably less than that which we regard as desirable. (iii) The implantation of "seeds" in such a manner as to produce an even irradiation of a given field presents technical difficulties much in excess of those encountered when treating a similar field with longer and more robust needles.

The uncertainty which existed about the needles in the earlier stages caused a rather careful selection of patients. Thus, with few exceptions, the lesions treated were minor tumours of the skin, mostly rodent ulcers with an occasional early squamous cell epithelioma of the skin or lip in which local infiltration was slight and in which metastases to glands had not occurred. In lesions of this type failure on the part of a radon treatment did not necessarily preclude the successful adoption of some other form of therapy and, although fairly common, in no case was such a failure followed by any untoward consequence to the patient.

The first radon treatment was carried out in April, 1931. The numbers of lesions treated in the following three years are set out in the accompanying table; they indicate our more recent satisfaction with radon by the greater number of lesions and greater preponderance of squamous cell epithelioma of the lip in the third year.

Condition.	April 1, 1931, to March 31, 1932.	April 1, 1932, to March 31, 1933.	April 1, 1933, to March 31, 1934.
Pre-malignant conditions	6	8	19
Rodent ulcer	20	17	55
Squamous cell epithelioma of skin	13	22	50
Squamous cell epithelioma of lip	6	4	21
Various	10	1	2
Total	55	52	147

It was stated above that most of the tumours in this series were small and superficial. This may have had some bearing upon our choice of a method of treatment which, in the main, has consisted of interstitial implantation, as opposed to surface irradiation from small wax moulds. In certain situations—the ear, the back of the hand and the skin of the nose—such surface irradiation is probably always desirable, but we are not convinced that mould therapy offers advantages over interstitial

therapy in most other parts of the skin. It is probably correct to say that superficial treatments are less often followed by slow, pyogenic infections, that a small percentage of necrotic ulcers can be avoided by such treatment and that the ensuing scar is rather more often pliable and insignificant than when needles are buried in the tissues. The latter factor does not weigh heavily when set against the high average age of the patients, few of whom could object to a nodular scar where for a long period, probably years, a scabbed ulcer or tumour has been unaffectedly displayed. Necrosis following implantation of radon can nearly always be averted by care in the disposition of adequately filtered needles and accurately calculated dosage, but pyogenic infection is not so easily avoided and depends largely on the intelligence and cleanliness of the patient. A mould, on the other hand, has the disadvantage of requiring a far greater initial dose of radon, while there are sometimes practical difficulties in securing the immobilization of the apparatus which is so necessary in patients who are not admitted to the wards. It is recognized that factors other than the site of a superficial lesion may suggest the necessity for surface irradiation in individual cases; for example, an area with a poor blood supply is better thus treated. In general, however, it is our practice to implant the needles round tumours of the skin elsewhere than in the situations specified.

In speaking of the results obtained from treatment by means of radium emanation in the short period that has elapsed, it is possible to consider only the immediate effects and to compare these effects with those which follow radium treatments of a similar type. The four different mountings which we have used must be considered separately.

1. *Glass in Nickel.* The filtration provided by the glass in nickel needle was inadequate, so that a dose lethal to the tumour lay on the threshold of necrosis; where frank necrosis did not occur the scars were unnecessarily fixed and obtrusive. It was soon discarded as far as implantation is concerned, but was occasionally used thereafter on moulds, secondarily filtered through one millimetre of lead, mounted alone or in conjunction with radium to make up a sufficient concentration.

2. *Glass in White Gold.* In the glass in white gold type a satisfactory filtration was provided, but with a wall thickness of 0.8 millimetre the needle was bulky and a little unwieldy.

3. *Gold in Nickel.* Theoretically the gold in nickel needle was sufficiently filtered, and it was of a convenient size, no thicker than the standard platinum radium needle of wall thickness 0.5 millimetre. Thus it was that we persisted in attempts to improve it, despite many disappointing months in which tissue reactions were rarely obtained after the administration of what was thought to be a satisfactory dose. It had been our practice to apply in the morning needles which had been prepared and measured on the preceding evening, calculating the radon content at the time of treatment by subtracting an amount equal to the radon destroyed by natural decay. As described before, the method of sterilization was investigated as the cause of the absence of reaction

through leakage, but the results were unsatisfactory until a more efficient method of extraction and purification was adopted. Since that time (May, 1933) the immediate results have been quite comparable with those to be expected from radium treatments of a similar type. The supply has been regular, and the concentration even from week to week at about 1.5 millicuries per centimetre of needle.

4. *Glass in Platinum.* Glass in platinum needles were originally tried in October, 1933, some of them being submitted each week since then, together with a roughly equal number of gold-nickel needles containing a similar concentration. They have been used alternately on unselected patients in order to provide a fair comparison. It was felt that the open end of this needle might allow the passage of a dangerous amount of soft γ and β rays, but clinical experience with approximately forty lesions treated in this way has not provided justification for our fears. Consideration of the irradiation field round a single needle, as mapped out by Mayneord, shows what a surprisingly small beam of rays passes out in continuation of the line of the needle, and this is probably one reason for the absence of necrosis. A second cause is to be found in the fact that the "eye" of the needle is at, or very close to, the surface of the skin, so that any tissue damaged by the defect in screening must be of very small volume and correspondingly easily dealt with by the normal processes of repair. But whatever the reason, early necrosis has not occurred, and we have been as satisfied with this needle for the usual skin treatments as we are with the gold-nickel type. The rapidity with which it is made has inclined us more and more towards its routine use.

Comparison between Radium and Radon.

The following comparison between radium and radon may be made.

Taking radon first:

1. It is more adaptable as regards filtration and length of needle.
2. The danger of loss of the bulk supply is almost negligible.

3. It is economic from the viewpoint of the administration of a busy hospital in that the patients can almost all be treated without admission to the wards. On the other hand, it is far less economic from the aspect of the owner of the radium because a considerable proportion of the emanation is unavailable at any particular time. This proportion no doubt varies directly with the experience and ability of the technician who mounts the radon, and also with the efficiency of the method of extraction. It becomes very much greater as the quantity of radium salt in solution becomes smaller, for in a given apparatus the same total quantity of emanation adheres to the glass walls or is lost in other ways, whether a large or small amount of the gas is passed through. Investigations are proceeding in the Physics Department of the University of Adelaide to discover why less than 150 millicuries of radon can be obtained in any week from the 400 milligrammes of radium bromide held in solution. By the older methods

rather more radon was recoverable when only 300 milligrammes were available.

4. The possibility always exists of unfortunate consequences from an error in mounting and measurement.

5. The large initial dose which falls off exponentially may be a disadvantage. It certainly departs to some degree from the present-day teaching of the desirability of a small dose acting for a long time, but our numbers are too small and the interval too short to permit of any sound deductions being made on this point. Superficially at least, such a disadvantage has not been apparent. The suggestion that such a rate of decay is desirable as giving a form of continuous saturation is not borne out by the work of Love on the mitotic index in irradiated tumours, described at this Conference one year ago.

In regard to radium:

1. The content of needles and filtration is constant, thus giving a sense of security to the operator.

2. The whole quantity is rapidly available.

3. The rays are emitted at a constant rate, so that errors in dosage due to miscalculation of the rate of decay are avoided.

4. Where the needles are in constant use gradual loss of radium is almost inevitable.

In conclusion it may be stated that in an institution provided with an adequate quantity of radium in fixed mountings and with a sufficiency of bed accommodation, radium is, on the whole, to be preferred to radon. In our hospital, where such a Utopian state does not exist, the Radium Department counts itself very fortunate in having available a satisfactory supply of radon.

THE VENOMS OF SOME OF THE SMALL AND RARE AUSTRALIAN VENOMOUS SNAKES.

By C. H. KELLAWAY, M.C., M.D., M.S., F.R.C.P. (London),
(From the Walter and Eliza Hall Institute, Melbourne.)

An Australian snake that is not thicker than a man's little finger, whatever may be its length, cannot by its bite endanger the life of an adult human being." (Gerard Krefft, 1869.)

DURING the last five years we have had the opportunity of studying from time to time some of the more rarely occurring venomous snakes of Australia, and in the present communication I have gathered together the results of experiments upon some of these.

In most cases the small size of the snakes has made it inadvisable to collect the venom by making them bite through stretched rubber dam, and instead, when the gape and the length of fang were small, the snakes have been induced to bite the shaved thighs of rabbits, guinea-pigs and mice, and in the case of the smallest specimens, through a fold of the skin of the thigh or abdominal wall. We have avoided bites in regions where mechanical damage was liable to occur to vascular structures or viscera.

The snakes studied were the following:

Genus *Denisonia*: *Denisonia dæmelii* Günther, *Denisonia flagellum* McCoy (the little whip snake), *Denisonia suta* Peters, *Denisonia coronoides* Günther (the white-lipped snake).

Genus *Demansia*: *Demansia olivacea* Gray (the spotted-headed snake), *Demansia psammophis* Schlegel (the yellow-faced whip snake).

Genus *Pseudelaps*: *Pseudelaps harriettæ* Krefft (the stripe-necked or white-crowned snake).

Genus *Furina*: *Furina annulata* Dumeril and Bibron (bandy-bandy).

Denisonia Dæmelii Günther.

Mr. Eades captured a single specimen of *Denisonia dæmelii* Günther in April, 1931, at Chinchilla, south-western Queensland, and it was identified for me by Mr. Donald Thomson and Mr. H. L. Parker, of the British Museum. The specimen was 576 millimetres (22.7 inches) long, which, according to Parker,¹ is not quite full size (over 600 millimetres).

On April 13 it was allowed to bite a guinea-pig weighing 250 grammes and caused death with typical "neurotoxic" symptoms in 57 minutes. Two days later it bit a wild rabbit weighing 1.24 kilograms. Death took place in 7½ hours with symptoms indistinguishable from those of copperhead poisoning, except that hæmoglobinuria was not observed.

A fortnight later two rats weighing 250 and 270 grammes were bitten on the hind limb, the snake in each case biting well and holding on for two minutes. Both survived without exhibiting any symptoms.

Two further specimens were captured by Mr. Tom Eades in south-western Queensland in March, 1932.

On March 21 the first, 444.5 millimetres (17½ inches) in length, killed a white mouse of 20 grammes in 5 minutes. At a second bite it killed a guinea-pig of 360 grammes weight in 21 minutes, and, finally, a wild rabbit weighing 1.2 kilograms was bitten through a fold of the skin of the abdominal wall and succumbed in 45 minutes.

The symptoms in all these animals were similar: paralysis, collapse, starting movements and failure of respiration. The heart was still beating after death from asphyxia. The blood was fluid and the clotting time somewhat delayed—guinea-pig 8½ minutes, rabbit 20 minutes. The lungs were congested. There was œdema of the bitten part, and in the rabbit free blood-stained fluid in the peritoneum.

The second snake, 362 millimetres (14½ inches) long, killed a guinea-pig of 450 grammes weight following a snap bite in 34 minutes, and a mouse of 15 grammes at its second bite in 4 minutes. The symptoms and *post mortem* changes were identical with those described above.

The venom of this species contains no thrombin and apparently kills by paralysis of the motor endings in the respiratory muscles. It must be fully as active as that of the copperhead, since the venom yield in these slender snakes cannot be larger than a milligramme or two. It is possible that the bite might cause illness in man, but not a fatal result.

Denisonia Flagellum McCoy (the Little Whip Snake).

Denisonia flagellum McCoy occurs in southern Victoria. According to Kinghorn,⁽¹⁾ it grows to a length of 380 millimetres (15 inches). McCoy⁽²⁾ described a specimen 324 millimetres (12½ inches) long, and there is a single specimen in the National Museum, Melbourne, 410 millimetres (16 inches) long.

In November and December, 1931, and early in 1932 I was able to perform biting experiments using three snakes, all about a foot long, obtained for me by Mr. Donald Thomson and Mr. David Fleay. The first of these was allowed to bite twice in succession a wild rabbit weighing 1.2 kilograms. The animal exhibited no symptoms. A guinea-pig weighing 285 grammes received the third bite and likewise showed no ill effects. Finally, a few minutes later, the snake was allowed to bite a mouse weighing 25 grammes. This became paralysed in the hind limbs within eight minutes and succumbed four minutes later.

The second specimen caused the death of a guinea-pig of 265 grammes two hours and eighteen minutes after the experimental bite, but failed to cause any symptoms in a mouse which it bit three minutes after the guinea-pig.

Twenty days later the same two snakes were retested. The first, after holding on to the hind limb of a domestic rabbit weighing 1.2 kilograms for three minutes, failed to cause any symptoms, and the second bit with great avidity a rabbit weighing 0.77 kilogram, giving it three snap bites, but caused it no further inconvenience. This snake subsequently bit a guinea-pig of 240 grammes, holding on and chewing vigorously for one and a half minutes. As a result the guinea-pig died 51 minutes later.

A third freshly-caught specimen was allowed to bite a guinea-pig weighing 425 grammes. Death resulted in one hour following symptoms resembling those caused by the injection of copperhead venom. There were dyspnoea, paralysis of the hind limbs, general loss of tone, starting movements and failure of respiration. *Post mortem*, the blood was fluid, the heart was still beating and the lungs were congested.

The rabbit is moderately resistant to all the venoms of snakes of the genus *Denisonia* which I have tested. Injected subcutaneously, the lethal dose of *Denisonia superba* (the copperhead) is 0.7 milligramme per kilogram for rabbits, 0.06 milligramme per kilogram for guinea-pigs, and 1.2 milligrammes per kilogram for mice.

Since the bite of *Denisonia flagellum* invariably failed to cause symptoms in small rabbits, the venom must be less toxic than that of *Denisonia superba*, or the amount of venom yielded at a bite must be very small. Success in killing a mouse on one occasion, and a guinea-pig on another, after failure to cause symptoms in a rabbit, excluded the possibility that the snakes had exhausted their venom glands at the time of testing. These few biting experiments clearly indicate the innocuous nature of this small species. Assuming the dry venom to be of the same order of toxicity as that of the copperhead (*Denisonia superba*), the yield at a bite must have been less than a milligramme of dried venom.

The symptoms presented by those experimental animals which died as a result of the bite of this snake resembled those caused by the injection of a lethal dose of copperhead venom—paralysis of the hind limbs, dyspnoea, collapse and death with failure of respiration.

¹ Personal communication.

There was no indication of the presence of a thrombin in the venom; no *ante mortem* clots were found in the heart or vessels, and the blood collected immediately after death from the guinea-pigs' hearts clotted in less than twelve minutes, exhibiting only slight delay. *Post mortem* no very striking changes were observed in the lungs or other viscera, since the animals died too soon after the bite, nor did we observe any œdema or hæmorrhage of the bitten part.

Denisonia Suta Peters.

Denisonia suta Peters occurs in Queensland, New South Wales, and in parts of Central and South Australia. Its average length, according to Kinghorn,⁽¹⁾ is 380 millimetres (15 inches). Waite and Longman⁽³⁾ record a specimen 490 millimetres (19½ inches) long.

Mr. Tom Eades, in April, 1931, captured a single living specimen in Brigalow, south-western Queensland, which was identified for me by Mr. Donald Thomson. It was 416 millimetres (16½ inches) in length.

It was allowed to bite a guinea-pig weighing 357 grammes and caused paralysis and death from failure of respiration in sixteen minutes. Immediately after death the diaphragm responded well to faradic stimulation with the coils separated 25 centimetres, but stimulation of the phrenic nerve was effective only when the coils were not more than ten centimetres apart. The blood was fluid and there was no delay in the clotting time.

Two days and sixteen days later, when the reptile was in good condition, it was allowed to bite rabbits weighing 1.09 and 1.5 kilograms. Both survived without symptoms, though the snake was very active, opening its mouth wide, biting with avidity and holding on tightly.

The venom evidently contains no thrombin, since the clotting time of the guinea-pig's blood was not increased. Its toxicity, like that of the copperhead, depends upon its action on the motor nerve endings in the diaphragm. If its venom is as potent as that of the copperhead, the failure to cause symptoms in small rabbits following a bite by a large specimen indicates that the venom yield is small—less than a milligramme dry weight. It is most unlikely that the bite of this species could produce symptoms in man or large animals.

Denisonia Coronoides Günther (the White-Lipped Snake).

Denisonia coronoides Günther is a fairly common species, widely distributed throughout Australia and Tasmania. According to Kinghorn,⁽¹⁾ it does not exceed 500 millimetres (20 inches) in length. Boulenger⁽⁴⁾ describes a specimen 440 millimetres (17½ inches) in length. It is brown or olive in colour and has a white upper lip bordered above by a dark line. Through the kindness of Mr. Fleay we were able to carry out biting experiments, using several specimens from Wandin, Victoria.

A specimen 360 millimetres (14¼ inches) long, freshly captured in August, 1930, was allowed to bite a mouse weighing 27 grammes. Death ensued in 27½ minutes. A few minutes later it was allowed to bite a guinea-pig, which succumbed in 2 hours and 41 minutes. The symptoms in both animals were indistinguishable from those caused by a lethal dose of copperhead venom. The

guinea-pig an hour after the bite was paralysed in the hind limbs. It later became dyspnoic and collapsed and died following failure of respiration. The mouse was dyspnoic and weak and ataxic 13 minutes after the bite and later became collapsed. The heart was still beating after death from failure of respiration. The blood was fluid, there was some hæmorrhage at the site of the bite, and no obvious lesions in the organs.

Another specimen, 355 millimetres long, was allowed to bite a wild rabbit of 1.3 kilograms. There was some swelling and later necrosis at the site of the bite in the folded-up and shaved abdominal wall, but no general symptoms.

Another smaller specimen failed to cause any symptoms other than local swelling in a guinea-pig weighing 320 grammes, but a fourth specimen killed two guinea-pigs of 160 and 190 grammes in successive bites in 37 and 20 minutes respectively.

A slightly larger specimen from King Island, obtained in June, 1932, was allowed to bite a rabbit weighing 1.5 kilograms. The animal soon exhibited loss of tone, the head falling into a position dictated by gravity. There were starting movements and convulsions, and death took place in 2½ hours. *Post mortem* the blood was fluid, there were no clots in the heart or great vessels, and the clotting time was eight minutes. The lungs were somewhat congested, but no other lesions were present.

This species, on account of its small size, is unlikely to be dangerous to man or large animals. The results of these biting experiments, coupled with the fact that the yield at a bite is small, suggest that the venom is of the same order of toxicity as that of the copperhead (*Denisonia superba*). The King Island specimen must have yielded rather more venom than the others, since it killed a rabbit in two and a quarter hours. To achieve this result with a subcutaneous injection of copperhead venom, at least 2.0 milligrammes would be required.

It is not improbable that the bite of such a large specimen might cause symptoms in man, but it is extremely unlikely that a fatal result would ensue.

Demansia Olivacea Gray (the Spotted-Headed Snake).

The long, slender snake, *Demansia olivacea* Gray, is confined in its distribution to northern Australia and Cape York, and when fully grown may attain a length of over 1,200 millimetres (four feet). A dead specimen from the Lockhart River, collected by Mr. H. R. Rowan and identified by Mr. Donald Thomson, was 1,472 millimetres (58 inches) in length.

In 1929 Mr. Donald Thomson captured a number of living specimens in Cape York and collected their venom, which he kindly gave me for examination. This sample of venom weighed 13 milligrammes, and since it represented about a dozen milkings from various snakes, the average venom yield was about a milligramme. Possibly snakes of this species, like *Demansia textilis*, do not readily give up their venom on milking, and the small amount of venom yielded may be illusory.

Injected intravenously in domestic rabbits in a concentration of 2.0 milligrammes per cubic centimetre, this venom caused death in 4 and in 10 minutes in animals weighing 2.0 and 3.2 kilograms, which received 1.4 and 0.8 milligrammes per kilogram respectively. Two rabbits weighing 1.14 and 1.46 kilograms, which received 1.0 and 0.5 milligramme per kilogram respectively, survived without symptoms. The rabbits which died had a little

whipped-out fibrin in the right ventricle, but no *ante mortem* clots elsewhere. The remaining blood was fluid and the clotting time very greatly delayed. The venom is evidently feebly coagulant.

Apart from this action, the toxicity of the venom, as estimated by subcutaneous injection in guinea-pigs, is extremely feeble.

A guinea-pig of 230 grammes weight received 1.0 milligramme per 100 grammes, and guinea-pigs weighing 230 grammes and 200 grammes received 0.5 milligramme of venom per 100 grammes. The animals all survived without any untoward symptoms.

Since the venom was collected in the field and may not have been kept perfectly dry until it reached me, it is possible that the low activity of the sample may have been due to this cause. It was not, however, denatured, and lost very little weight when thoroughly redried in the laboratory.

Kinghorn's statement that the snake may be regarded as dangerous probably requires modification, since the venom is so feebly toxic compared with that of *Demansia textilis*, which has a certainly lethal dose for guinea-pigs of 0.025 milligramme per kilogram. Subject to confirmation by tests on fresh samples of venom or by biting experiments with the living snake it is probable that the bite of this snake is without danger to man or to large animals unless by chance a vessel were entered by the fangs.

***Demansia psammophis* Schlegel (the Yellow-Faced Whip Snake).**

Demansia psammophis is not very frequently met with, though widely distributed throughout Australia. It grows to a length of nearly 1,800 millimetres (six feet). Boulenger⁽³⁾ records one 1,420 millimetres in length. It is very slender and whip-like, and very quick in its movements. There are two oblique dark-edged yellow streaks in front and behind the eye—hence the common name.

In 1930 we obtained three living specimens of this species, two by purchase from New South Wales and one captured by Mr. Tom Eades in Brigalow, south-western Queensland. They were identified for me by Mr. Donald Thomson. All were less than three feet in length.

The largest of them, 845 millimetres (33½ inches) in length, was allowed to bite a guinea-pig weighing 460 grammes, and a few minutes later a mouse weighing 21 grammes. The guinea-pig succumbed in eight hours from failure of respiration after exhibiting paralysis of the hind limbs and dyspnoea. At autopsy there was extensive hæmorrhagic oedema round the site of the bite. The lungs were congested with patchy hæmorrhages and the small intestine was also much congested. The mouse died 2 hours and 43 minutes after being bitten and showed little else than hæmorrhage and oedema of the bitten part.

Three days later the snake was allowed to bite a small wild rabbit weighing 0.93 kilogram. This he did very willingly, but, apart from some swelling of the bitten part, the rabbit suffered no ill effects.

Kinghorn⁽⁵⁾ quotes Krefft's statement that a bite causes no more harm than the sting of a bee, but modified this by the remark that he has seen several cases in which the victims suffered severe pain and much swelling for several days. The local effects in our animal experiments accord with the symptoms produced in man. Presuming the yield at a

bite to be of the order of a milligramme of dry venom, the time necessary to cause death in a guinea-pig suggests that the venom possesses only feeble toxicity, though absorption may have been delayed by the presence of a thrombin, a possibility of which we have no evidence.

***Pseudelaps harriettæ* Krefft (the Stripe-Necked or White-Crowned Snake).**

The pretty little snake known as *Pseudelaps harriettæ* Krefft, which occurs only in southern Queensland, is very easily recognized by its characteristic marking. It is a slender snake, brown in colour, with a large white area on the nape which is continuous with the white on the sides of the head and end of the snout. The scales on the sides of the neck have each a single light-coloured longitudinal stripe.

In May, 1932, through the courtesy of Mr. David Fleay, we obtained from Brisbane a single small specimen of this species, 355 millimetres (14 inches) long. Biting experiments with this were made on two successive days and a week later.

A good bite failed to cause any symptoms in a guinea-pig weighing 274 grammes. The following day a mouse weighing 20 grammes died 55 minutes after being bitten, though on this occasion the snake was very unwilling to bite. There were no obvious lesions in the dead mouse. There were no thrombi in the heart or vessels, and blood from the heart clotted six minutes after being withdrawn. Seven days later two mice, each weighing 19 grammes, were bitten, but both survived without symptoms.

According to Kinghorn, snakes of this species attain a length of 22 inches, so that our specimen must have been only about half grown. The venom yield, even in a full grown snake, must be very small, and these experiments suggest that the venom is not particularly potent. Failure to kill a small guinea-pig when the snake was in good condition and willing to bite might indicate either that the guinea-pig is resistant to this venom—a very unusual finding with Australian snake venoms—or that the venom is of very low toxicity. The death of a mouse after a less satisfactory bite on the following day excludes the possibility that the snake failed to inject any venom into the guinea-pig. This snake may therefore be regarded as quite harmless.

***Furina annulata*, Dumeril and Bibron (the Bandy-Bandy).**

Furina annulata is the largest and least rare species of the genus *Furina*. It is widely distributed in Australia. It is very easily recognized by its distinctive alternate transverse bands of black and white (Figure I). The head is not marked off from the body and is black above with white transverse bands across the nape and snout. It may attain a length of 750 millimetres (30 inches). The specimen we examined was 622 millimetres (24½ inches) in length and was captured in April, 1931, in Queensland by Mr. Tom Eades.

On April 13 it was allowed to bite a wild rabbit weighing 1.5 kilograms. Having bitten, it held on for 5 minutes and the rabbit died 22 minutes from the commencement of the bite. The symptoms were rapid in onset and culminated in profound collapse and loss of tone, convulsive twitching and death from respiratory

failure. There was definite curari-like paralysis of the diaphragm. The muscle gave good contraction with direct faradic stimulation with the primary and secondary coils separated 24 centimetres, whereas by stimulation of the phrenic nerve only feeble contraction was observed with the coils separated 7.5 centimetres. The blood was fluid and clotted in four minutes. There were no lesions in any of the organs. Two days later a guinea-pig weighing 660 grammes was bitten, but survived without symptoms.

Ten days after the first biting experiment the snake was milked. Two small beads of venom were obtained, which were diluted with distilled water to 0.25 cubic centimetre and injected intravenously in a wild rabbit weighing 1.0 kilogram. Death took place in six minutes. There was no clotting in the heart or great vessels. Six days later, time being allowed for the venom glands to be replenished, the snake was allowed to bite two guinea-pigs of 500 and 570 grammes weight in succession, but neither exhibited any symptoms.



Photograph of *Furina anaulata*, the bandy-bandy, from life, by Mr. Donald Thomson.

These results are of some interest since it is rare to find that the guinea-pig is resistant to any of the Australian venoms. It is conceivable that the first guinea-pig tested was bitten at a time when the snake, having bitten the rabbit two days earlier, had not refilled his venom glands, but the snake held on and bit hard for three minutes, and it is certain that by this time the glands would be partially replenished. The venom must be much less toxic for guinea-pigs than the venoms of the tiger snake, brown snake, copperhead or death adder, of which the lethal doses are 0.02, 0.025, 0.06, and 0.15 milligramme per kilogram.

The venom does not contain a thrombin. Its toxicity for the rabbit is due to its paralysing action on the peripheral motor nerve endings in the diaphragm. It does not appear to be strikingly hemolytic.

It is unlikely that even the largest specimen of this species would be dangerous to an adult man or large animals. In any case, as Kinghorn points out, this species is very inoffensive and seldom attempts to bite when handled.

Discussion.

Observations on the effects of bites by these eight small venomous snakes illustrate the truth of

Krefft's⁽⁶⁾ statement quoted at the head of this communication. None of these species is dangerous to man or large animals, though the bite of large specimens of one or two of them may possibly cause general symptoms of envenomation.

Their slender build goes hand in hand with narrow heads, small venom glands and small venom yields, a correlation which Hamilton Fairley and Splatt⁽⁷⁾ stressed in discussing the danger of bites by the larger and commoner snakes.

Krefft's dictum should possibly be modified with reference to the young of such species as *Notechis scutatus*, the tiger snake, because the venom is so highly toxic. Since 0.5 milligramme of this venom can, as Hamilton Fairley⁽⁸⁾ showed, kill a sheep, the two or three milligrammes yielded by a young tiger snake may be expected to cause serious symptoms in man.

The venoms of the four *Denisonias* are generally similar to that of *Denisonia superba*, the copperhead, and these experiments furnish no indication that any of them exceed this in potency. The venom of *Demansia olivacea*, apart from the possession of a feeble thrombin, bears very little resemblance to the very highly potent venom of *Demansia textilis*, and that of *Demansia psammophis* is not highly toxic. The venom of the single *Furina* cannot be regarded as being very highly potent and contains no coagulant principle.

Acknowledgements.

My thanks are due to my one-time colleague, Mr. Donald Thomson, for the identification of most of the snakes studied and for the excellent photograph of the bandy-bandy; to Mr. H. L. Parker, of the British Museum, for help in the identification of *Denisonia damellii*; and to Mr. David Fleay for the gift of several snakes.

References.

- ⁽¹⁾ J. R. Kinghorn: "The Snakes of Australia", 1929, pages 174, 188, 190.
- ⁽²⁾ F. McCoy: *Prodromus of the Zoology of Victoria*, December 2, 1878, page 7.
- ⁽³⁾ E. R. Waite and H. A. Longman: *Records of the South Australian Museum*, Volume I, 1920, page 176.
- ⁽⁴⁾ G. A. Boulenger: *Catalogues of Snakes in the British Museum*, Volume III, 1896, pages 322 and 336.
- ⁽⁵⁾ J. R. Kinghorn: *Loco citato*, page 136.
- ⁽⁶⁾ G. Krefft: "The Snakes of Australia", 1869, page 10.
- ⁽⁷⁾ N. Hamilton Fairley and Beryl Splatt: "Venom Yields in Australian Poisonous Snakes", *THE MEDICAL JOURNAL OF AUSTRALIA*, March 16, 1929, page 347.
- ⁽⁸⁾ N. Hamilton Fairley: "Criteria for Determining the Efficacy of Ligature in Snake Bite", *THE MEDICAL JOURNAL OF AUSTRALIA*, March 23, 1929, page 377.

Reports of Cases.

THROMBOSIS OF THE CRANIAL VENOUS SINUSES FOLLOWING A MILD INFECTION OF THE NASOPHARYNX.

By RAYMOND T. BINNS, M.B., B.S. (Adelaide),
Clinical Assistant, Medical Section, Adelaide Hospital.

As thrombosis of the cranial venous sinuses occurs infrequently, a short résumé of the aetiology will not be out of place here.

The usual predisposing cause of the condition is suppurative disease of the middle ear or of the mastoid. Less often it follows other septic conditions affecting the region of the head and neck, such as nasal sinusitis, alveolar abscess, pyorrhoea, cellulitis of the face, neck or

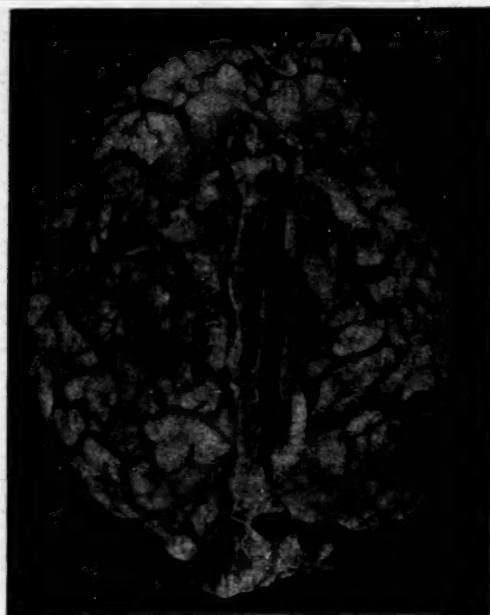


FIGURE I.

Superior surface of the brain showing the thrombosis of the superior longitudinal sinus, the thrombosed parietal veins and the subarachnoid hemorrhage in the right parieto-occipital region.

scalp. It sometimes occurs as a complication of acute febrile illnesses, such as typhoid fever, influenza, pneumonia, meningitis, bacillary dysentery (especially infantile dysentery with dehydration of the tissues), or as a complication of blood diseases, such as leuchæmia and chlorosis. "Marantic thrombosis" is a term often used to describe this type of case.⁽¹⁾

Another group of cases of thrombosis of the sinuses is described,⁽²⁾ which are not preceded by any of the above-mentioned conditions, and their ætiology is unknown. These are termed primary or autochthonous. They are very rare and a clinical diagnosis is seldom made.

In the following case the only preceding condition which may have predisposed to the formation of the thrombosis was a common cold with a very mild myringitis.

Clinical History.

The patient was a boy, aged nineteen months, of average weight and normal development. His previous health, except for one attack of bronchitis, had been good and his parents were healthy. The first sign of ill health was a cold in the head, which was followed a few days later by an earache. Examination of the left ear revealed an inflamed tympanic membrane which did not bulge. The myringitis subsided completely in several days and subsequently there was no further sign of disease of the ear.

On the eighth day of the illness the child began crying continually and putting his hand to his head as if suffering from headache. During the next two days he vomited persistently and became very restless and irritable. Two small sloughs appeared on the mucous membrane of the mouth, near the openings of Stenson's ducts, and spread forwards inside the lips, forming a membranous stomatitis. The tonsils and pharynx were quite unaffected.

The general condition became gradually worse during the next few days. The temperature ranged between 36.7° and 37.8° C. (98° and 100° F.). On more careful examination it was observed that the anterior fontanelle (which had not closed) was bulging, and the superficial veins of the scalp were full and prominent. There was some rigidity of the muscles of the back of the neck and retraction of the head; Kernig's sign was present to a slight degree. Both plantar reflexes were extensor (Babinski). There was an internal squint of the left eye due to paralysis of the left external rectus, and the muscles of the left side of the face twitched occasionally. Double papilledema was present, the right disk having one diopter of swelling and the left two to three diopters.

A lumbar puncture was performed and the fluid flowed freely from the needle under very high pressure. The fluid was found to be normal on pathological examination, and the cultures of it were sterile. A blood count disclosed a secondary anæmia (hæmoglobin value 62%) and a polymorphonuclear leucocytosis of 28,000 per cubic millimetre.

On the fourteenth day of the illness further signs of a rising intracranial pressure appeared. The extreme irritability lessened and the child lapsed into coma. In a few hours the pulse rate fell from 102 to 68 per minute. Operative treatment was imperative, and a left-sided sub-tentorial decompression was performed and the left cerebellar hemisphere was explored with a needle. No pus was found. The right temporo-sphenoidal region was trephined and explored, and the right lateral ventricle was tapped. Clear fluid only was withdrawn. The child was much better for the next few days after the operation. The improvement was apparently due to the relief of the intracranial pressure. But still the intense engorgement of the superficial veins of the scalp, the bulging of the fontanelle, the paralysis of the left external rectus and the papilledema persisted. Later a slight proptosis of the left eye was observed.



FIGURE II.

Section of superior longitudinal sinus showing organization of the thrombus.

Ten days later the signs of a high intracranial pressure were still present, and it was therefore decided to explore the cerebellum more extensively for tumour. The cranium was widely opened in the occipital region, and the inferior surface of the cerebellum was examined. Cerebro-spinal fluid escaped under increased pressure, but no other patho-

logical lesion was found. The child died a few hours after the operation, and an autopsy revealed the cause of death.

Autopsy.

There were extensive subarachnoid hæmorrhages on the lateral surface of the right temporal and parietal lobes of the cerebrum, also hæmorrhages on the inferior surface of the right temporal lobe, on the superior surface of the cerebellar hemispheres, on the base of the brain, and on the ventral surface of the pons. Both lateral venous sinuses, the superior longitudinal sinus, the right cavernous sinus, and the petrosal sinuses were thrombosed. The clot was firm, adherent to the walls of the sinuses, and partially organized. The parietal veins of both cerebral hemispheres were also thrombosed, and a perivascular exudate of lymph had formed along their course. The macroscopic and microscopic appearances of the affected sinuses and veins showed that the thrombosis was non-septic and was not recent in formation. Meningitis was not present, and there was no suppuration in the middle ears or the mastoids.

Comment.

Thrombosis of the sinuses occurring after such a mild naso-pharyngeal infection is rare. The obstruction to the venous circulation caused an increase in quantity and pressure of the cerebro-spinal fluid and the subarachnoid hæmorrhages. The resulting clinical picture of raised intracranial pressure suggested a diagnosis of subtentorial tumour.

Acknowledgement.

My thanks are due to Sir Henry Newland, who performed the operations, and to Dr. C. T. C. de Crespiigny, for their advice in the management and treatment of the case.

References.

- ¹ W. G. Wyllie: "Thrombosis of the Cerebral Sinuses following Pneumonia and other Morbid Conditions", *British Journal of Children's Diseases*, January-March, 1924, page 124.
- ² R. K. Byers and G. M. Hass: "Thrombosis of the Dural Venous Sinuses in Infancy and in Childhood", *American Journal of Diseases of Children*, Volume XLV, June, 1933, page 1161.

Reviews.

DIATHERMY.

In the second edition of "Diathermy in General Practice" Dr. Payten Dark has added to material which made the first edition of so great interest, additional facts which increase the value of the book. With further information of a technical nature there is a chapter on the "Use of Diathermy in the Treatment of Mental Disorders", by Dr. Guy P. U. Prior, Medical Superintendent, Mental Hospital, Parramatta. This deals with a comparatively recent method of treating general paralysis of the insane by long-sustained hyperpyrexia. This advance on other methods the profession owes to Neymans and Osborne, of Chicago. It is pleasing to note that Dr. Prior, using, by the way, a machine made in Australia, has had results which suggest further trial of the treatment.

As in the first edition of "Diathermy in General Practice", the reports of the cases treated by Dr. Dark and also by Dr. Prior and Dr. Maguire are of the greatest interest. These are given with such completeness that

¹ "Diathermy in General Practice", by E. P. Dark, M.B., Ch.M., with chapters on Diathermy in Gynaecology, with special reference to Major Surgery, by F. A. Maguire, M.D., Ch.M., F.R.C.S., F.R.A.C.S., and Diathermy in the Treatment of Mental Disorders, by G. P. U. Prior, L.R.C.P., M.R.C.S.; Second Edition; 1934. Australia: Angus and Robertson, Limited. Demy 8vo., pp. 231, with illustrations. Price: 17s. 6d. net.

no one can complain of lack of detail. It is to be noted that Dr. Dark and those who have assisted him have had results which must satisfy the most critical as to the value of diathermy.

Included in the book is a summary of cases which the author has termed "failures", but all do not deserve the title. Some of the patients seem to have been of the class which demands an immediate and almost miraculous cure. Every medical man, and particularly the physiotherapist, has to deal with these. Inability to satisfy them can scarcely be termed "failure".

Dr. Dark gives an excellent chapter on "Surgical Diathermy of the Tonsils". In it he discusses the perennial controversy on the relative values of extirpation and diathermy, or better, electro-desiccation, for the removal of diseased tonsils. In favouring the electrical treatment Dr. Dark gives reasons for the view he expresses. There is no doubt that tonsils can be effectively removed by this method. As the author states, many so-called failures are due to patients becoming weary of what is a long treatment.

The author's results in the treatment of cases of high blood pressure are satisfactory. Dr. Dark has done much to make diathermy known and respected in Australia as it deserves to be.

A BOOK ON VOLUMETRIC ANALYSIS.

So many text books on qualitative and quantitative analysis have already appeared that one necessarily looks for some special features, such, for example, as an improved presentation and more modern treatment of the subject, or perhaps an attempt to meet the demands of a particular type of student, as a justification for a further addition to the list. The book under review, "Volumetric Analysis", by A. P. Starck, originated in connexion with the author's teaching of pharmacy, medical and general students, and some prominence has been given to the analysis of substances of special interest to the pharmaceutical student. The analyses of these particular substances, however, have not been allowed to interfere with a very complete and orderly account of the three main sections of volumetric analysis, namely, acidimetry and alkalimetry, oxidation and reduction and precipitation methods.

In connexion with the first of these, a simple and very useful account of the theory of indicators is given. While very little is offered in the way of explanation of the form of the titration curves which appear in the text, these curves should, when used in conjunction with the very useful indicator chart reproduced from the British Pharmacopœia, enable the student to make an intelligent choice of indicators for the different occasions. The section on oxidation reduction reactions includes experiments dealing with the use of titanous chloride, while the last chapter on precipitation methods refers to experiments involving the use of uranyl acetate, sodium sulphide and ammonium molybdate. Each section of the book is concluded with a useful set of problems, the answers to which are given.

Very little is included with regard to matters relating to primary standards in volumetric analysis, the limits of tolerable error for different volumetric instruments and the accuracy with which any of the determinations can be made. Apart from this, the general treatment throughout the book is particularly good. The reaction or reactions upon which each estimation is based and the method of calculation are set out with admirable clarity, so that the book should form a very valuable adjunct to any general course in volumetric analysis. The book itself is well produced, but the publication is to some extent spoiled by the inclusion of an appendix on qualitative analysis which is not up to the same high standard as the remainder of the book.

¹ "Volumetric Analysis", by H. P. Starck, M.A.; 1934. London: Baillière, Tindall and Cox. Demy 8vo., pp. 236, with illustrations. Price: 7s. 6d. net.

The Medical Journal of Australia

SATURDAY, JULY 21, 1934.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE FIFTH AUSTRALIAN CANCER CONFERENCE.

IN this issue is published a report of the Fifth Australian Cancer Conference. Each year these conferences have proved increasingly valuable. They have provided a means of reporting progress made in the treatment of cancer by radium owned by the Commonwealth Government, and by X radiation, and latterly more attention has been paid to surgery and its place in cancer treatment. Physicists, radiotherapists and clinicians have met and have tried to understand the aspects of the problems peculiar to each, and every worker has found that his own field extends into that of others. No one can deny that everyone concerned has reaped an advantage. We may in short say that the Australian cancer conferences have become an important feature in Australian medicine. The fifth conference was in many ways encouraging, but it had its defects. As an accompaniment to the report it may be useful to draw attention to the encouraging features, to point out some defects and to make suggestions for future years.

Great importance must be attached to the visit to the conference of the Prime Minister, the Honourable J. A. Lyons. No one could see in his words and in his attitude anything but sincerity; and most encouraging is his statement that if scientific investigators would show the way, the Government would do its utmost to give effect to their findings. Possibly few people realize how much the Commonwealth Government has done for cancer research and treatment. Without its initiative in supplying radium and without its concern, shown in successive conferences, that the radium should be put to the best possible use, much of the work that has been done in Australia in cancer research and treatment would not have been undertaken. Incidentally it is well at the present time to remind the public that a great deal of work in cancer has been done in Australia. The second point is that the results of treatment of cancer patients reported to the conference show that the work of the laboratory is being applied with success. The action of the Commonwealth Government in supplying radium is more than vindicated. Further, and this is of interest to clinicians, the fifth conference was more clinical in its material than its predecessors have been; the place of surgery in the treatment was not forgotten, and the passing of a resolution emphasizing the importance of surgery will be welcomed by those who take a comprehensive view of the cancer question.

Turning to what may be regarded as defects, we have once again to deplore the fact that only two of the Australian Branches of the British Medical Association saw fit to send representatives to the session; the attitude of the other four Branches is difficult to understand. In regard to the conference itself, the programme suffered from overweight. Too much was attempted in the time available. Papers were taken out of their places and not nearly enough time was left for discussion. It should surely not be necessary to point out that at a conference of persons supposed to be experts in cancer, papers ought not to be planned in the textbook style so that they contain information that all present know and could recite just as well and possibly better than the speaker. These things should be remembered in future conferences. Much

may also be said for the custom adopted in some places of not allowing any member to read his paper; in these circumstances he would talk about his subject and members would be able to read the paper when it was published *in extenso* later on. We hold that only in exceptional circumstances, such as those occasioned by illness, should a paper be read in the absence of the author; the habit of sending papers to be read by some one else at gatherings such as conferences or congresses is becoming much too common in Australia.

In spite of the minor defects to which attention has been drawn, the Australian cancer conferences are probably the most successful gatherings of their kind that are held in the Commonwealth. They are composed of persons devoted to the subject under discussion (any medical practitioner interested in cancer is welcomed) and there are no diverting social functions to destroy the scientific atmosphere. Whether the proposed local conferences in the several States will be of definite value remains to be seen. They must be regarded as concessions to parochialism; they will lack the atmosphere of a national undertaking, but they may prove useful in drawing the attention of medical practitioners to the importance of early diagnosis and will no doubt demonstrate clearly what can be done in treatment.

Current Comment.

THE USE OF ABDOMINAL SUPPORTS IN THORACIC DISEASE.

THE value of an abdominal binder in giving comfort and support to a young child in the throes of whooping cough must surely be well known to all general practitioners who have the opportunity of following the course of this long and trying malady. The use of this device is sometimes extended also to elderly or feeble patients with constant and unproductive cough, and it is often found to be beneficial to strap the chest of patients suffering from pleurisy if the support is applied low enough to control the upper abdominal muscles to some extent. But with these exceptions it is probable that no further attention has been paid to the possible advantages of employing an abdominal support in thoracic disease. True, many observers must have noticed that an adequate corset or other appliance has relieved the breathlessness of obese patients with pendulous abdomens and sadly overtaxed

abdominal muscles. Such relief has been rightly attributed partly to the relief of strain upon the long visceral column stretching from the pleural domes to the pelvis, which is interrupted only by the diaphragm, and partly to the assistance thereby given to the intraabdominal circulation. But the diaphragm is often functionally incapacitated for various reasons, and the effects of such a support upon the thoracic contents is worth study.

Burgess Gordon, in a recent article, discusses the mechanism of abdominal supports in pulmonary disease, and considers their use and the benefits which may be expected.¹ In his studies of patients suffering from various forms of lung disease he remarked that in these obese subjects the abdominal movement is very poor, little assistance being given when they cough; in conditions of malnutrition, the abdominal excursions were usually preponderant, and after a hard bout of coughing the diaphragm was often observed to be actually at a lower level during the ensuing inspiration than might be expected in more robust persons. A flattened diaphragm was found in emphysema, as others have reported, due to the over-distensions of the lungs. A trial was made of abdominal supports in a series of forty-one patients suffering from a variety of pulmonary diseases, including chronic bronchitis, with and without asthma, bronchiectasis, pneumoconiosis, and pulmonary tuberculosis. Radiological studies were made, the type and nature of the breathing were observed, and graphic records were made of the position and degree of mobility of the diaphragm. In only eighteen of these patients were the results sufficiently constant to be accurately tabulated, and in certain members of the group the use of the belts was discontinued on account of discomfort or the coincident extension of a severe pulmonary disease.

It is, of course, very difficult to summarize the results of a routine type of treatment in such heterogeneous pathological states, but the most constantly observed change was that the diaphragm showed a certain degree of ascent, accompanied in a number of cases by a relief from dyspnoea and cough. Gordon points out that several factors are probably involved in the explanation of benefits that some of these patients received. These are the relative rest to the lungs by the more even distribution of chest movements over several planes; the better coordination of all the respiratory musculature; the prevention of undue rebound of the diaphragm by the steadying of the abdominal viscera, and the facilitation of clearing of secretion from the lower lobes. On the whole he considers that it is disadvantageous for the diaphragm to operate at a low level, and that measures directed towards the correction of this fault may be expected to give a certain measure of relief to a considerable number of sufferers from chronic lung disease.

A more restricted study, and, therefore, in some ways of greater weight, is published by H. L. Alexander and W. B. Kountz in the same issue of

¹ *The American Journal of the Medical Sciences*, May, 1934.

the journal quoted. These authors describe the benefits they have conferred upon patients suffering from emphysema, by the application of a special abdominal belt. This device contained a screw fitting which allowed an adjustable pressure to be applied to the lower part of the abdomen, and in this way the leaflets of the diaphragm were forced to assume a higher level. It was found that not only was the inspiratory position of the diaphragm raised, but during expiration it became still more sharply arched. The result of this was that lung volume was reduced and respiratory function was correspondingly improved. Out of twenty-five patients with advanced emphysema, nineteen have been subjectively improved, and the average increase in their vital capacity was nearly 40%.

It would seem to be worth while to consider a problem that is chiefly mechanical from a mechanical point of view. Where the lungs are embarrassed by a low and poorly functioning diaphragm, and where the slackness of the abdominal muscles warrants an attempt to supply support, not only to the abdomen, but also to the lower part of the thorax, such an attempt should be made. It has been pointed out in these pages before that fixity of the chest must not be confused with emphysema, nor must the local pulmonary condition due to fibrosis or cavitation be regarded from the same pathological view point as that due to undue stretching of the air cells, but in any one of these states it is possible that the indications for some mechanical device might be fruitfully considered. In other words there is probably a small but definite group of patients who may gain much more relief by the wearing of an appropriate support than some of those who are firmly harnessed to control the wanderings of a feared, though often innocuous floating kidney.

GRANULOPENIA.

IN 1922 there were recorded the first cases of a highly lethal disease characterized by a severe angina of the fauces with necrosis, and a remarkable paucity or complete absence of granular leucocytes. The disease became known as granulopenia, granulocytopenia, agranulocytosis and agranulocytic angina. The nomenclature has been discussed already in these columns (July 23, 1932). Most authorities now believe that the angina is an indirect effect rather than a cause of the granulopenia; the depletion in the polymorphonuclear leucocytes makes the body more vulnerable to the attack of pyogenic bacteria. Many hundreds of cases have been reported, and the incidence seems to be increasing. It is probable that many mild cases are not recognized. The aetiology is obscure. It is well known that the injection of bacteria into laboratory animals may often cause a temporary leucopenia and that similar effects may be produced in man by virulent infection or poisoning by such substances as benzene or drugs of the arsphenamine group. Recently it has been suggested by various

workers in the United States of America that the use of amidopyrine might produce granulopenia. Madison and Squier, for example, discuss a series of fourteen patients, six of whom were allowed amidopyrine and died; of the remaining eight, who were not allowed amidopyrine, only two died; of the six who recovered, one had three recurrences, two of which were known to have followed the taking of amidopyrine. It is pointed out by various workers that the persons most liable to granulopenia are medical practitioners and members of their households, nurses, and members of hospital staffs—persons who are most likely to acquire the habit of taking amidopyrine as an analgesic.

Recently, R. R. Kracke and F. P. Parker have contributed some further information concerning the possible influence of this drug in the causation of granulopenia.¹ They report a series of eleven cases in which a feature common to all was the habitual use of drugs of the "benzamine" group. Each of these so-called benzamine drugs has in its formula a benzene ring and an attached amine group; included among them are the arsphenamines, amidopyrine, acetanilid, and phenacetin. Aspirin is not included, as it has no attached amine group. Kracke and Parker point out that the presence of the amine group greatly increases the ease with which the substance can be oxidized. They suggest that there is an end product common to benzene and the drugs of the benzamine group; this may be para-quinone or ortho-quinone. They point out that the highest incidence of granulopenia is in Germany and the United States of America, and that in England the incidence is low; they suggest that this may be due to the more restricted use of the benzamine drugs in England than in the other two countries. As a further argument, they remark that some of these drugs, notably those in combination with the barbiturates, have been introduced only within the last ten to twelve years, the period in which granulopenia has appeared and developed. Of course, if these drugs do cause granulopenia, it does not follow that all persons taking them are liable to the disease; Kracke and Parker remark that "it is necessary to presuppose the existence of a previously weakened, damaged, or idiosyncratic bone marrow".

Apart from the arsphenamines, the only drug of the benzamine group that is largely used in Australia is phenacetin. The barbiturates, however, are used freely, often in combination with other drugs. Numerous proprietary medicines, consisting of mixtures of barbiturates with coal-tar derivatives, are available. In view of the suspicion that has been cast on the benzamine group of coal-tar derivatives, medical practitioners should make sure of the composition of these preparations, and should use them, when necessary, with caution. It is of interest to observe that the administration of analgesic drugs of the benzamine group to persons suffering from granulopenic angina may be the main or only reason for the high mortality rate.

¹ *The Journal of Laboratory and Clinical Medicine*, May, 1934.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Relation of Ingestion of Milk to Calcium Metabolism.

AMY L. DANIELS *et alii* (*American Journal of Diseases of Children*, March, 1934) have investigated the retentions of calcium, phosphorus and nitrogen in children receiving diets differing chiefly in the amounts of calcium, which was furnished by one pint and one quart of milk respectively. Although wide variation was found to exist in the amounts of these essential constituents retained by different children of approximately the same ages and by the same children under varying conditions of diet and of vitamin D, the results indicated that one pint of milk will supply sufficient calcium for the normal child between three and five years of age, provided the diet furnishes enough protein, phosphorus and vitamins from other sources. The pronounced differences in the amounts of the various constituents retained by different children and by the same children under varying conditions appear to be due to the physiological condition of the children at the time of study and to their potentialities of growth. Those who had been previously well nourished retained more of the constituents of growth than did those who had been well fed. Normal children between three and five years of age were found to retain from three to ten milligrammes of calcium, from six to eight milligrammes of phosphorus, and from 34 to 90 milligrammes of nitrogen per kilogram. It is suggested that the high retentions reported by other investigators may have been due to the fact that the children examined were at the beginning deficient in the substances studied.

Blood Transfusion in Acute Poliomyelitis.

IRVING SHERMAN (*American Journal of Diseases of Children*, March, 1934) has had the opportunity of studying a series of 71 patients suffering from acute poliomyelitis treated by blood transfusion from immune donors. He deprecates the small size of the series studied. Within twenty-four hours the temperature was afebrile in 32 patients (45%). Fever abated within forty-eight hours in 29 patients (14%). Compared with a control series of 55 patients treated by convalescent serum, the fever lasted on an average for 100 hours, as compared with 36 hours in the patients who were given transfusions. The author states that the results were so encouraging that a fair and extensive trial should be given to the method in future

epidemics. Transfusion from immune donors decreases the mortality, and if given during the pre-paralytic stage, decreases the incidence of paralysis. An important feature is the proper organization of blood donors, as a branch of a donors' club or similar organization arranged by public health authorities.

Auto-infection by Diphtheria Carriers.

H. LAUSECKER (*Münchener Medizinische Wochenschrift*, February 9, 1934) describes two instances of auto-infection in children aged eight years and nine years respectively, who were diphtheria carriers. Both were admitted to hospital with scarlet fever, which in both ran an ordinary uncomplicated course. One had been vaccinated five days before admission; he had abundant diphtheria bacilli in the nose. Six days after admission one of the vaccination points had become an ulcer measuring 3.5 by 6.0 centimetres, with raised and thickened edge and yielding abundant diphtheria bacilli. The general condition of the child was not affected. With the application locally of diphtheria antitoxin, 16,000 units, over several days, the infiltration quickly subsided. The other child had muco-purulent nasal discharge and small rhagades at the corner of the mouth. In the course of five days after admission he developed membranous ulceration of the nares and of the corner of the mouth, the latter spreading to the buccal mucous membrane and to the tongue. The appearance was that of commencing noma. The bacteria found were abundant diphtheria bacilli, fusiform bacilli, spirochaetes and staphylococci. The temperature rose to 39.0° C. (102.2° F.). After intramuscular injection of 16,000 units of antitoxin the membrane was shed, the stomatitis cleared up, and the temperature fell. The identity of the diphtheria bacilli was confirmed by injection into guinea-pigs.

Popular Urticaria.

D. W. WINNICOTT (*The British Journal of Children's Diseases*, January-March, 1934) holds *urticaria papulosa* to be a manifestation of skin irritability depending on psychological conflict in the child's mind. He states the condition to be a "normal" phenomenon; a skin excitement corresponding to the erection of excited erectile tissue (*glans penis*, *clitoris*, *nipple*, *mucous membrane of the nose et cetera*). He points to the universality of the disorder in almost all children at some time or other and to its rapid appearance and disappearance according to changing emotional states. When it becomes generalized and distressing the paediatrician is dealing with a complicated psychological disorder corresponding to obsessive onanism, in which the skin has become the battle-

ground of a fight, chiefly unconscious, between an urge demanding gratification and a sense of guilt which threatens to deprive the child (ego) of an entire pleasure system. The author points to the ineffective results of pharmacopœial treatment, including *lotio calamina*, with change in diet; he records several instances in which adjustment of the psychological environment resulted in the disappearance of the eruption. He considers popular urticaria to be related to angioneurotic œdema, certain types of eczema, and in particular *pruritus ani*, which, he concludes, all have a psychological basis. While external irritants must not be neglected, the dynamics of the child's feelings should not be left out of consideration in any skin complaint.

Blood Lipids in Scarlet Fever and Rheumatic Disease.

A. D. KAISER AND M. S. GRAY (*American Journal of Diseases of Children*, January, 1934) have made a comprehensive study of the blood lipids in scarlet fever and acute rheumatism. A control series of twenty-nine normal children were first investigated, the figures of previous observers varying too much to be reliable. The results obtained by these authors were fairly constant in normal children between the ages of five and sixteen, but were considerably below the accepted averages for normal adults. Investigation was then made of the values for blood lipids in forty-three children convalescing from scarlet fever. The results were in the main of the same order as those for normal children. Deviations from the mean, particularly in respect to cholesterol, were considerably greater. Similar values were found for lipids in twenty-two children with acute rheumatism and twenty with chronic rheumatism. The standard deviations were much greater for the children with rheumatism than for the series of normal children. Values for blood lipids deviated considerably from the normal in nephrosis and nephritis. Values for blood lipids were not influenced by ordinary variations in the diet. The deviations from the mean noted in normal and in sick children seemed to bear no relationship to an increased or diminished intake of fat or carbohydrates. No appreciable difference was noted between the two sexes in this regard. Similar deviations were found in both boys and girls. Determinations made in the summer months were uniformly lower than determinations in the winter months. Studies in the blood lipids with rheumatic disease and scarlet fever revealed values therefore which are similar to those found in normal children, but the standard deviations from the mean were considerably greater in children with those infections than in normal children. It is quite likely that the infection rather

than the varied amount of fat ingested was responsible for the increased deviation.

ORTHOPÆDIC SURGERY.

The Treatment of Common Metatarsal Disabilities.

J. T. RUEH (*The Journal of Bone and Joint Surgery*, January, 1934) discusses the causes of falling of the anterior metatarsal arches, and divides them into two classes: those producing relaxation of the arch and those producing contraction of the toes. Pain and disability are common to both; but therein the similarity ceases, inasmuch as the contraction type occurs solely in adults and is primarily due to short shoes with high heels. It is useless to attempt to correct this type by metatarsal bars and pads beneath the heads of the bone; but he finds great relief by tenotomizing the plantar flexors of the toes through one incision over the head of the fifth metatarsal bone and making the patient walk early and passively stretch the toes each day during convalescence. Those of the relaxed type are greatly relieved by adequate support.

Effect of Sympathectomy and of Venous Stasis on Bone Repair.

P. E. McMASTER AND N. W. ROOME (*The Journal of Bone and Joint Surgery*, April, 1934) examined the effect of sympathectomy and of venous stasis on bone repair in the experimental stage. Their experiences have shown, both clinically and experimentally, that more pronounced and more lasting effects, such as increased warmth and dryness of the skin, result from ganglionectomy than from periarthral sympathectomy. Yet, with the increased arterial hyperæmia resulting from lumbar sympathectomy, this procedure did not hasten the repair of bone in the experiments described. In half of their uncomplicated experiments healing was actually retarded when compared with the non-sympathectomized side. The results of their experiments, in which venous stasis hastened the repair of bone, confirm similar observations made by other workers. In diseases such as synovial tuberculosis, hæmangioma of the leg, Brodie's abscess of the upper end of the tibia, giant-cell tumour of the tibia, femoral and iliac thrombosis, recurring hæmarthrosis of the knee from hæmophilia, chronic osteomyelitis of the femur, severe trauma to soft parts with resultant and prolonged infection and ulceration, and fracture of the femur, as well as in the experimental work, there are all stages of congestion from a sluggish circulation to a marked venous stasis. Hence it appears that bones grow more rapidly and heal more promptly in the presence of venous congestion. They state that following lumbar sympathectomy there is present an arterial hyperæmia with an increased blood flow and no venous stasis or sluggish-

ness of circulation; consequently this procedure would not be expected to have the same stimulating influence on bone growth or repair as venous ligation. They conclude that experimental lumbar sympathectomy in dogs did not hasten bone repair, in fact in the majority of cases bone healing was retarded, but that experimental venous stasis in dogs hastened bone repair.

Fractures of the Neck of the Femur.

W. R. MACAUSLAND, A. R. MACAUSLAND, AND H. G. LEE (*Surgery, Gynecology and Obstetrics*, April, 1934) maintain that the efficacy of the Whitman abduction method in treating fractures of the neck of the femur is still established and that the methods devised with a view to shortening the convalescent period have been used in too few cases to allow conclusions to be drawn as to their value. In the light of present experience the limited application of these newer forms of treatment, and particularly of operative methods, should be appreciated. The authors attempt to define the proper place of operative interference in treatment at the present time and express the opinion that the results from the use of the Whitman method have been favourable. The fundamental principles governing the treatment of these fractures, they consider, are as follows: (i) early care, including the treatment of shock and the prevention of the development of pneumonia and cardiac disturbance; (ii) accurate reduction of the fragments; (iii) maintenance of the fragments in good position for a sufficient period to insure union; (iv) careful after-treatment; (v) the institution of function to prevent excessive atrophy of the proximal fragment; (vi) careful observation of the process of healing. Reduction, when possible, should be made immediately after the injury. After the lapse of more than a week's time reposition of the fragments by a conservative form of treatment is more difficult and may even be impossible because of the presence of blood clots and fibrous tissue. There are in use at the present time three methods of reduction: the Whitman abduction method, various forms of traction, and operative methods. The selection of the method depends upon the age of the patient, the presence of complications, the type of fracture and the experience of the surgeon in a particular line of treatment. With the introduction of newer forms of skeletal traction, such as the Jones traction splint and the skeletal traction splint devised by Anderson, which are more available and simple and accurate in application, they consider that these methods are being used more widely. Only four operative methods have been recommended for the treatment of fresh fractures: the Hey-Groves "proximal pegging" operation, the Albee graft method, the Jones graft method, and the Smith-Petersen fixation. At the present time they are considering whether opera-

tive reduction of the fracture may not have a place in the treatment of selected patients under sixty years of age. Certainly in many fractures at other sites in which conservative manipulation fails to result in accurate reduction, simple exploration with anatomical reposition gives perfect results. Of the four methods in use, the most satisfactory, in the authors' opinion, is the bone graft method, for such an operative procedure not only provides for fixation of the fragments, but it also introduces a callus-forming substance into the fractured area.

Neuro-Surgery in the Treatment of Diseases of the Peripheral Blood Vessels.

D. J. MACMYSN (*The British Journal of Surgery*, April, 1934) discusses the treatment from a surgical standpoint of *thrombo-angiitis obliterans*. The indications for the operation of sympathetic neurectomy are: (1) In those cases in which the vasomotor index is sufficiently high or in which there is an adequate range of increased temperature in the extremities following the administration of typhoid vaccine. (2) In progressive cases in which unsatisfactory results are obtained by medical treatment. The contraindications may be summarized briefly as follows: (i) the presence of acute fulminating ulceration; (ii) progressive gangrene; (iii) low vasomotor index, as obtained by the skin temperature tests; (iv) general contraindications, such as debility, cachexia *et cetera*. The author considers it impossible to give more definite rules regarding the advisability of operation, as each case offers an individual problem. It is well to admit the patient to hospital a few weeks before operation, in order to try to improve his circulation by a medical régime. Patients who present themselves with acute lesions, such as ulcers or gangrene, are not operated upon until healing of the ulcer begins, and in gangrenous digits until the line of demarcation between healthy and diseased tissue appears. When sympathetic neurectomy is held to be contraindicated, amputation may have to be resorted to in some cases. The most frequent indications for amputation are progressive gangrene and uncontrollable pain in the presence of extensive occlusion of vessels which do not respond to vasodilating agents. The author finds it difficult at times to decide at what level to amputate. Occasionally an amputation of a toe or finger for a small area of superficial gangrene is successful, but usually a high amputation is indicated. If the popliteal artery is felt on examination to pulsate, amputation below the knee may be tried, but even then, in many cases, reamputation above the knee may be necessary as the result of poor healing. Occasionally the amputation is complicated by gas gangrene infection, which, however, is usually fairly benign.

Public Health.

CANBERRA CANCER CONFERENCE.

THE Fifth Australian Cancer Conference was held at Canberra from April 17 to 20, 1934. The meetings were held at the Institute of Anatomy. Dr. J. H. L. Cumpston, Director-General of Health, Commonwealth Department of Health, occupied the chair.

The delegates to the conference comprised the following:

Commonwealth Department of Health: Dr. J. H. L. Cumpston, C.M.G., Director-General of Health; Sir Colin MacKenzie, Director, Australian Institute of Anatomy; Dr. R. W. Cilento; Dr. M. J. Holmes, D.S.O.; Dr. H. E. Downes; Dr. W. C. Sawers, D.S.O., School of Public Health and Tropical Medicine, University of Sydney.

New South Wales: Professor R. S. Wallace, Vice-Chancellor, University of Sydney; Dr. H. G. Chapman, Dr. Constance D'Arcy, Mr. T. Wilkins, representing the Cancer Research Committee of the University of Sydney; Professor D. A. Welsh; Dr. A. T. Nisbet, representing the Royal Prince Alfred Hospital and the Sydney Hospital; Dr. H. H. Schlink, Dr. C. L. Chapman, Dr. E. M. Fisher, Dr. G. Raffan, Dr. R. L. Davies, Dr. A. H. Tebbutt, representing the Royal Prince Alfred Hospital; Dr. H. S. Stacy, representing the Royal Australasian College of Surgeons and the Sydney Hospital; Dr. Sylvia Bray, Dr. Lyle Buchanan, representing the Sydney Hospital; Dr. Clarence Read, Dr. R. J. Silvertown, representing the Royal North Shore Hospital of Sydney; Dr. Leila Keatinge, representing Saint Vincent's Hospital; Dr. H. M. Moran, representing the New South Wales Branch of the British Medical Association; Dr. E. H. Molesworth; Dr. W. H. Love; Dr. W. Moppett; Dr. George Harker; Dr. Philip Parkinson; Dr. E. W. Frecker; Dr. George Norrie; Dr. W. G. Harding.

Victoria: Professor T. H. Laby, F.R.S.; Dr. C. E. Eddy; Mr. A. H. Turner; Dr. R. Kaye Scott, representing the Melbourne Hospital; Dr. H. O. Johnson, representing the Austin Hospital; Dr. W. G. Cuscaden, representing the Women's Hospital; Dr. K. Stuart Cross, representing the Victorian Branch of the British Medical Association; Dr. T. F. Ryan, representing the Royal Australasian College of Surgeons; Dr. R. D. Wright; Dr. Thomas Cherry; Dr. L. S. Kidd.

Queensland: Dr. Val McDowall, Dr. Casey, representing the Brisbane and South Coast Hospitals Board; Dr. L. M. McKillop, representing the Queensland Cancer Trust and the Townsville Hospital Board; Mr. E. R. B. Pike, representing the Queensland Cancer Trust.

South Australia: Dr. F. S. Hone, Dr. B. S. Hanson, Dr. I. B. Jose, Dr. J. Stanley Verco, representing the South Australian Anti-Cancer Campaign; Dr. John Mayo; Mr. A. R. Riddell.

Western Australia: Mr. G. Bourne, representing the University of Western Australia.

Tasmania: Dr. B. M. Carruthers, representing the Hobart Public Hospital; Dr. W. P. Holman, representing the Northern Tasmanian Anti-Cancer Campaign and the Launceston Public Hospital.

New Zealand: Dr. J. S. Elliott, Professor E. F. D'Ath, Dr. C. de Monchaux, Mr. J. A. Strong, representing the New Zealand Government and the New Zealand Branch of the British Empire Cancer Campaign; Dr. F. N. Harvey, Dr. P. Clennell Fenwick, representing the New Zealand Branch of the British Empire Cancer Campaign.

Medical practitioners from Canberra and district attended.

The Editor of THE MEDICAL JOURNAL OF AUSTRALIA was present.

Unveiling of a Bust of the Late Thomas Peter Anderson Stuart.

Prior to declaring the conference open, the Honourable J. A. Guy, Acting Minister for Health of the Commonwealth, unveiled a bust of the late Sir Thomas Peter

Anderson Stuart that had been presented to the Institute of Anatomy by Lady Anderson Stuart. Mr. Guy paid a tribute to the work of Anderson Stuart and said that the high standard of medical knowledge and practice was due mainly to the standard of medical teaching established by four great men: Stirling in Adelaide, Halford and Allen in Melbourne, and Anderson Stuart in Sydney. The Minister also said that the graduates of the Sydney school had maintained the high standard set by Anderson Stuart.

Professor D. A. Welsh, in the course of a short address, said that Anderson Stuart had fully attained the two objectives that he had set up, the building of a great medical school and the development of a high standard of professional ability and honour in the graduates of the school.

Opening of the Conference.

In declaring the conference open, the Honourable J. A. Guy said:

It is with great personal interest that I am here today to open this conference, which is meeting for the purpose of limiting as far as is possible the very serious loss to the community and the great individual distress caused by cancer. This matter is of the utmost importance not only to Australia, but to the world. The situation is such that the utilization of every available means of control must be insured in order to check the onward march of the disease.

I think it is not too much to claim that Australia is taking a leading part in the practical co-ordination of all units of the army being mobilized against a common enemy, and it is with some pride that I recall that the Commonwealth Government has not been at any stage hesitant in doing all it possibly could in discharging this important public duty.

The year 1932 showed a further considerable rise in the cancer mortality rate in Australia, which now stands at 105 deaths *per annum* in every 100,000 of the population. In Australia there were 6,875 deaths from cancer in that year. One death in every 8.3 occurring in 1932 was due to cancer. This means that at the present rate of cancer mortality 800,000 persons now living in Australia will die of this disease; and an even greater number if the cancer mortality rate continues to rise, as it has done steadily for many years past.

Although cancer is generally looked upon mainly as a cause of death in elderly people, the actual truth is that the proportion of cancer deaths to the total deaths occurring at any given age is highest in middle age. Cancer is easily the principal cause of death in middle age in females, and we have the almost incredible situation that in 1932, of all deaths occurring in women between the ages of 50 and 60 years, one in every 3.8 was due to cancer; and at the early age of 45 to 50, one in every 4.4.

Figures such as these compel action to stay the ravages of the disease, and I can imagine nothing more conducive to progress in this direction than this meeting together of men whose time, brains, energy and enthusiasm are so unselfishly devoted to the fight against cancer at every point of approach.

In the absence of adequate knowledge regarding causation and prevention, the main reliance must for the present be placed upon treatment. The progress which has already followed upon the holding of these conferences, in co-ordinating the activities of the men who are actually treating cancer with those who are investigating its physical and pathological problems, and with those dealing with the administrative and social aspects, lends encouragement to the hope that still more complete and practical cooperation will result. The development, for example, of definite physical and pathological services available to every treatment centre is much to be desired.

The Commonwealth Government has already shown its practical interest in the campaign against cancer by the purchase of radium and its issue free of cost to treatment and research centres, and by the provision of facilities directed towards the attainment of scientific accuracy in the application of treatment. This Government has in the past seven years expended £153,000 in connexion with the

control of cancer. This financial year it has provided approximately £3,000 for the subdivision and remounting of radium according to the recommendations of the last Cancer Conference. It has recently appointed an assistant physicist at the Commonwealth Radium Laboratory with the object of relieving the physicist in charge of the laboratory of his routine duties, in order that he may devote his time to the investigation of the physical problems of radiotherapists and to giving practical assistance and advice in these difficult matters.

Only by scientific accuracy in the application of available means and measures can progress be made. These conferences have done much good and continue to do much good in stimulating progress towards the attainment of scientific accuracy and in guiding progress along sound lines. The Commonwealth Government will watch the outcome of your discussions with interest and will consider seriously and sympathetically such recommendations as the conference may make.

The Commonwealth Government was glad to be informed that the representatives of the New Zealand Government derived from the last Australian Cancer Conference much assistance of practical importance to the Cancer Campaign in that Dominion. It notes with pleasure that the New Zealand Government has this year sent a larger delegation to this conference. I wish to take the opportunity not only of cordially welcoming these representatives of our sister Dominion, but of assuring these delegates of the desire of the Commonwealth Government and of this conference to cooperate in every possible way with them and with the movement in New Zealand.

It will be of interest to you to know that more than 11,500 cases of malignant disease have been treated with radium or radium combined with other methods at the Australian treatment centres since the Commonwealth Government distributed the radium some five years ago.

It is generally admitted that it is not desirable to draw inferences from treatment results in less than five years from the application of treatment. Such five-year figures are not yet available in Australia in sufficient number to justify tabulation, but it may be pointed out that of 3,071 cases of operable carcinoma (excluding rodent ulcer) treated with radium during the past five years (none of them less than twelve months ago) 62% are known to be alive and free of symptoms and only 4% are known to have died of cancer. Of the 12% who have been lost sight of, the great majority were well when the last information was obtained. The remainder have shown local improvement. These figures may be considered as definitely encouraging.

In declaring this conference open, and on behalf of the Commonwealth Government, I take these figures as ground for sounding a most optimistic note. I do not believe that the combined intellectual resources of the world can fail to master this great human tragedy as they have mastered in turn each great menace which has threatened the human race.

The Prime Minister's Address.

At a later stage the conference was addressed by the Right Honourable J. A. Lyons, P.C., in the following terms.

I am glad to know that every State in the Commonwealth is represented at this Conference, but it was with a feeling of very special pleasure that I received from my colleague, the Prime Minister of the Dominion of New Zealand, an official intimation that that Dominion would be represented. I know also that the delegation from the Dominion includes several of its leading men, and I extend to those gentlemen, both officially and on behalf of the Government and personally, a most cordial welcome.

The realization of the actual position regarding cancer in the Commonwealth has caused me much concern. The fact that so many of our people are dying, and so many more are destined to die from this disease is in itself disturbing enough; but that a considerable proportion of our women die in their best years is an aspect of the situation embodying a challenge which we must not fail

to accept. It is not possible for me to supply the necessary solution of this problem. It is a matter for you gentlemen assembled here to advise those who have authority what should be done, and I now make an especial appeal to you to give the best of your attention and effort to providing a comprehensive scheme whereby this serious situation may be faced and adequately met simultaneously over the whole Commonwealth.

It is clearly not a matter for overmuch talking or of over-elaborate organization, but it is a matter for immediate and sustained effort. In this effort is involved a determination and clear definition of the relative responsibility of governments, of universities, research centres, hospitals, health departments, and all other agencies, and of the people themselves, adequately and efficiently linked together in this common cause. Surely immediate action should be taken to insure that this common understanding for a single purpose should be achieved without delay. The steps then to be taken should be deliberately defined. Here are questions that I cannot answer, but which I feel fully justified in putting to you. I realize that in this particular field the whole answer cannot be at once forthcoming, for it if it had been so the world would surely have known of it. But I realize clearly that we may not pause until we have that answer, and I ask this conference to supply whatever portion of the answer can be immediately supplied. The matter of cancer is one of the most important that any Government has to face. The Commonwealth Government looks to this conference to indicate what is required to be done, and when that is indicated any government would be wanting in its duty if it failed to do what is practicable within the limits of its powers.

Chairman's Address.

Dr. J. H. L. Cumpston, in introducing the business of the conference, referred to the presence of representatives of so wide a range of activities in the field of cancer investigation and control. He particularly welcomed the delegates of the Government of New Zealand and of the New Zealand Branch of the British Empire Cancer Campaign, the Vice-Chancellor of the University of Sydney, the representatives of the several universities, the Royal Australasian College of Surgeons, the Queensland Cancer Trust and the New South Wales and Victorian Branches of the British Medical Association. He regretted the fact that the remaining State Branches of the British Medical Association were not represented and that no representative of any State Department of Health was present. He drew attention to the fact that the conference was each year growing in members and in the scope of its activities. It was the only means at present existing for coordinating the activities in the various fields of cancer organization and control in Australia and for bringing together for effective discussion the workers in these various fields. This year the number attending and the various activities represented was larger than at any previous conference.

Dr. Cumpston said that all those matters which had been referred by the previous conference to the Commonwealth Department of Health for action had received attention. The action taken would be reported in detail under the appropriate items of the agenda. He expressed appreciation of the work done during the year by Dr. E. S. Meyers, of Brisbane, as secretary of the committee appointed by the last conference to draft a scheme of federal organization, and regretted that Dr. Meyers was unable to attend in person to present the report of that committee to the conference, which would shortly consider it. The thanks of the conference were due to Dr. Meyers and to his committee for a difficult piece of work well carried out, and for the report prepared for the conference. In this connexion Dr. Cumpston indicated the difficulties which Dr. Meyers had met with in preparing the report of a committee whose members were scattered all over Australia. Dr. Meyers had particularly drawn attention to these difficulties in his report. Similar difficulties were encountered by the other committees which the conference had appointed to carry out specific functions. The members

of the Pathological Committee and of the Permanent Committee on Case Records, for example, had been unable to meet, and but for the personal contact which Dr. Holmes had been enabled to provide in some instances, little progress could have been made. This indicated that any scheme of organization adopted should not depend upon the formation of a committee whose members, by reason of distance and other factors cannot work in close personal touch. Strong State organizations must be built up and, with these as a basis, cooperation to insure uniformity of aims should present little difficulty. Within the State organizations there must be close cooperation between the various activities. For example, there should be the closest bonds between the treatment centres and the university departments of physics and pathology, in order that the necessary physical and pathological services might not only be available to, but fully utilized by the treatment centres. The Commonwealth could not provide these services or implement the cooperation. This must be done by the States. The Commonwealth Department of Health did not assume any authority of leadership of the movement or of control of a federal organization, nor had it any intention of doing so. This was not the function of the Health Department. Suitably constituted local State organizations should be formed to carry out the necessary work, and the Commonwealth Department of Health would be glad to do what it could to assist in appropriate directions and to coordinate the work as between the several local organizations.

A full opportunity for the discussion of this matter would be given when the report of the Federal Organization Committee was under consideration by the conference, but he suggested that in the interval before that discussion took place, members should try to define what exactly was the objective they wished to achieve in any form of organization proposed. The meeting place of the next conference would be considered at the same time as the matter of federal organization, and the conference would be asked to decide where it would hold its next meeting.

Dr. Cumpston then drew attention to the review of developments of the past year which had been prepared for the conference, and indicated the mass of statistical tables setting out results obtained by various methods of treatment. He asked the conference to determine whether the information was such as it and the treatment centres really required and whether its value was commensurate with the large amount of work entailed in the compilation of the tables. The information tabulated should only be such as was of real practical and scientific value, and if any suggestions were forthcoming regarding the improvement of these compilations, they would be welcomed.

Review of Developments in Cancer Control.

Dr. M. J. Holmes had prepared an extensive review of the recent developments in cancer control; this was circulated among members of the conference.

Among the more important sections of the statement was one dealing with developments in connexion with the provision of treatment facilities. Since this is of interest to our readers, it is reproduced here *verbatim*:

New South Wales. The State Department of Health is making good progress in the development of a new cancer treatment centre at the Coast Hospital. The State Government has purchased radium for use at this centre and a high voltage deep therapy X ray plant is being installed. This hospital is fortunate in the possession of a considerable number of much-needed beds.

Important developments are taking place also in the provision of improved facilities for treatment at the Royal North Shore Hospital.

At the Sydney Hospital a high voltage deep therapy X ray plant has been installed and in active use during the year. A full description of this plant will be given to the conference.

Additional radium was supplied by the Commonwealth Department of Health on loan to the Newcastle Hospital.

Requests received from other hospitals both in the metropolitan and country districts for radium are under consideration, but decision regarding allotment must await

the review of radium allocation which will be made when the two grammes of radium sent abroad for reconditioning have been returned to Australia.

Victoria. At the Melbourne Hospital the work continues to expand and the number of patients requiring attention has more than taxed the resources of the radiotherapeutic department. During the year an effort has been made to secure in-patient accommodation for convalescent cancer patients—patients who have had extensive radium treatment and who need hospitalization during the reactionary stages. The radium ward can only accommodate patients during actual treatment. Convalescent hospitals will not accept malignant cases. There is a shortage of accommodation for advanced cases also.

At the Austin Hospital the in-patient accommodation for cancer patients comprises 83 beds, and improved facilities have been added to the operating theatre, including the latest intratracheal anæsthetic apparatus and a surgical diathermy plant. These items are important because at this hospital a large number of cases of head and neck cancer are treated in a stage permitting of little more than palliative surgery.

This hospital has excellent accommodation and facilities for the treatment of cancer, but the large majority of the patients come from other metropolitan hospitals in so advanced a stage of the disease that little more than palliative treatment can be given. Consequently the accommodation and equipment are not utilized to the best advantage from the point of view of the selection of suitable cases for treatment. The more advantageous use of the accommodation and equipment at this hospital would appear to be a matter depending upon a more effective coordination of activities in relation to cancer control within the State.

Queensland. At the Brisbane General Hospital steps have been taken to provide a high voltage deep therapy plant. The only deep therapy plant at present in Brisbane is that maintained by the Queensland Cancer Trust at its clinic at the Mater Hospital. Patients at the Brisbane Hospital requiring X ray therapy are transferred to the Mater Hospital at the expense of the Queensland Cancer Trust. A Hammer dosimeter has recently been installed for use with this deep therapy plant.

The Queensland Cancer Trust has added to the accommodation at the Mater Hospital for out-patient work in connexion with the cancer clinic, for the administration of the radium department and treatment by X ray, diathermy and carbon dioxide snow. In-patient accommodation is, however, insufficient, and the Brisbane General Hospital assists in making beds available.

In addition to the deep X ray therapy treatment provided at the Trust's clinic at the Mater Hospital, Brisbane, arrangements have been made through the Townsville and Cairns Hospital Boards, under which the X ray treatment of necessitous cases is undertaken by a private practitioner, the fees being paid by the Trust.

Diagnosis and treatment at the several centres established by the Queensland Cancer Trust is free and, in addition, travelling facilities are extended to necessitous cases.

South Australia. Difficulty still arises from the insufficiency of bed accommodation at the Adelaide Hospital, but arrangements have been made to utilize more systematically beds available in the cancer block in the new hospital at Northfield.

Western Australia. Accommodation at the Perth Hospital is adequate. Treatment of patients by deep X ray therapy has been facilitated by the installation of a new X.P.T. tube with forced water cooling system and high capacity "Metalix" rectifying valves. Treatment time is reduced to half that previously necessary. A Strauss Mekapion dosimeter has been installed.

Tasmania. At the Launceston Hospital a small ward adjacent to the radium ward provides additional bed accommodation. A surgical diathermy machine has been loaned to the hospital, and funds have been raised and tenders called for the purchase and installation of a high voltage deep therapy plant.

Dr. Holmes summarized the principal points arising out of his review as follows:

1. Treatment facilities are expanding and increasing accuracy in the application of treatment is being attained. Bed accommodation, though still very inadequate, is increasing. A new treatment centre has been developed at the Coast Hospital, Sydney, and improved treatment facilities have been provided at other centres. Inefficient X ray equipment is being replaced by new high voltage equipment, provision is being made for determination of quality of output, and dosimeters are being installed, measuring in r units. Facilities are available for calibrating the measuring instruments, cooperation between therapists and physicists has become increasingly valuable, and the first steps have been taken towards providing a definite physical service to treatment institutions.

2. The opinion has been formed that the increase of screenage of radium and radon needles from 0.5 to 0.8 millimetre of platinum equivalent has proved advantageous.

3. Increasing preference is shown towards the use of radon for treatment under the conditions governing its issue and use in Melbourne. At the Melbourne Hospital alone 14,000 millicuries were used during last year. A new radon plant is being developed at the University of Perth, and an additional quantity of radium applied to radon production at the University of Adelaide.

4. The precautions for protection of staffs against stray radiations have been carefully observed at all treatment and other centres, and no evidence of damage to health has been found.

5. Increasing efficiency in the methods adopted for keeping in touch with patients after treatment is evident. At the Melbourne Hospital only 3.7% of carcinoma patients treated at the radiotherapeutic department in the past five years have been lost sight of. At some hospitals the system is being extended to include patients treated by surgical methods.

The careful keeping of records has enabled a valuable review to be made of the results obtained in the treatment of 11,760 cases of malignant disease of various regions by radium or radium combined with other methods during the five years ended 30th June, 1933. Of 3,071 cases of carcinoma of various regions in an operable stage treated during these five years 1,918, or 62%, are alive and free of symptoms.

Very detailed analysis of the results of treatment of cancer by any method for any selected region is also made possible from these accurate and uniformly kept records, and this year detailed analysis was made in respect of cases of cancer of the buccal cavity, male urogenital system and ovary.

6. Diplomas in therapeutic radiology and electricity and in diagnostic radiology have been provided at the Melbourne University in addition to the provision already existing for a diploma in radiology at the University of Sydney.

It would be of great value if arrangements could be made for post-graduate courses in cancer at the universities.

Important developments have taken place towards providing for the benefit of treatment institutions definite physical services based on the universities. Similar steps for the development of pathological services would be most desirable.

Statistical Study of Results of Treatment.

Dr. M. J. Holmes presented a review of mortality statistics and of the results obtained in the treatment of cancer of certain regions. In the review of cancer mortality statistics Dr. Holmes pointed out that the impression that cancer mortality was not a serious factor except at comparatively late ages was unsound. Cancer was responsible for a very high proportion of the deaths occurring in middle age. It was easily the principal cause of death in middle age in females, and in males came second only to the diseases of the heart and circulatory system.

The statistics presented by Dr. Holmes were very extensive. A selection will be made of some of the tables to show the trend of mortality from cancer in Australia.

Dr. Holmes pointed out that Tables I and II showed that although fluctuations occurred in the mortality curve, the tendency was steadily upwards. In the decades since 1879 the greatest increase in the mortality rate in a decade was fifteen; the lowest increase eleven. The increase in the three years since 1929 was already seven. There was thus no evidence as yet of any tendency towards a slowing down in the rate of increase in the mortality rate from cancer.

The State of Queensland still continued to show the lowest mortality rate in the Commonwealth (90 per 100,000 of mean population in 1932). The State of Victoria in 1932 exhibited the highest mortality rate (118 per 100,000 of mean population).

Table III showed that of the total deaths from all causes occurring in Australia, the proportion due to cancer still continued to rise both among males and females.

Table IV indicated the proportion of cancer deaths to total deaths in five-yearly age groups for ages over 40 years. Dr. Holmes pointed out that it would be seen that as early as age 40 to 44 years cancer accounted for one death in every five females dying within that age group. Between ages 45 and 59, in middle age, cancer accounted for one death in every four females dying within this age period.

In males the proportion of cancer deaths to total deaths was greatest in age groups 55 to 74.

The later incidence than in females of the high proportionate cancer rate in males was largely due to the fact that cancer of the female breast and genital organs occurred in general at an earlier age than cancer of the regions in which male cancer mortality was highest.

This table indicated the unsoundness of the impression that cancer mortality was not a serious factor except at

TABLE I.
Deaths from Cancer, Australia, 1859-1932.—Rates per 100,000 of Mean Population.

Year.	New South Wales.			Victoria.			Queensland.			South Australia.			Western Australia.			Tasmania.			Commonwealth.		
	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.
1859	16	11	14	7	16	10	..	..	..	11	9	10	..	..	..	..	..	..	..	..	..
1869	28	22	25	22	32	27	..	..	..	19	10	15	..	..	..	..	..	..	..	..	..
1879	25	25	25	47	45	46	16	26	19	23	27	25	6	17	10	55	51	55	33	35	34
1889	37	36	37	56	59	58	35	34	35	42	44	43	..	..	45	55	45	50	..	..	45
1899	58	56	57	74	68	71	56	43	51	59	57	58	38	31	36	46	62	53	61	58	60
1909	74	74	74	83	78	80	62	57	60	78	81	80	64	75	69	56	74	65	71	73	72
1919	92	78	86	84	89	87	82	75	79	93	95	94	93	64	81	75	98	81	88	82	85
1929	98	91	95	106	107	107	94	80	88	117	101	109	99	84	92	91	100	96	101	95	98
1932	109	90	100	117	118	118	100	79	90	108	115	112	122	89	106	106	99	104	111	99	105

TABLE II.
Deaths from Cancer, Australia, 1920-1932.—Rates per 100,000 Mean Population.

Year.	New South Wales.			Victoria.			Queensland.			South Australia.			Western Australia.			Tasmania.			Commonwealth.		
	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.
1920	84	78	81	91	91	91	79	79	79	92	89	90	89	74	82	74	73	73	86	82	84
1921	85	83	84	92	90	95	88	69	79	96	88	92	90	79	85	72	96	84	88	87	87
1922	87	85	85	100	98	100	92	78	86	98	93	95	97	80	89	87	87	93	88	91	91
1923	86	83	84	96	107	102	94	70	83	98	92	95	86	64	76	82	73	77	91	87	89
1924	95	90	93	103	100	101	84	74	80	97	95	96	100	79	90	91	93	92	96	91	93
1925	100	87	94	96	100	98	91	81	97	89	93	89	73	81	102	82	92	97	88	92	92
1926	99	86	93	101	101	101	91	84	88	93	96	95	87	94	90	91	85	88	97	91	94
1927	97	89	93	94	106	100	83	81	82	87	97	93	97	78	83	104	102	103	93	93	93
1928	97	91	94	105	109	107	90	78	84	102	97	100	88	84	86	77	86	78	97	94	96
1929	96	91	95	106	107	107	94	80	88	117	101	109	99	84	92	91	100	96	101	95	98
1930	96	88	92	104	105	104	84	74	80	99	106	102	104	95	99	80	110	95	96	94	95
1931	99	95	97	111	106	109	105	77	91	112	124	118	110	81	96	100	100	100	105	97	101
1932	109	90	100	117	118	118	100	79	90	108	115	112	122	89	106	108	99	104	111	99	105

TABLE III.
Proportion of Deaths from Cancer as Compared with Total Deaths—Australia, 1908-1932.

Year.	Males.		Females.		Total.	
	Rate per 10,000 Deaths.	Proportion Due to Cancer.	Rate per 10,000 Deaths.	Proportion Due to Cancer.	Rate per 10,000 Deaths.	Proportion Due to Cancer.
1908	562	1 in— 17-7	719	1 in— 13-8	629	1 in— 15-9
1913	641	15-5	769	13-0	695	14-3
1918	794	12-5	911	10-9	844	11-8
1923	831	12-0	993	10-0	902	11-0
1928	941	10-6	1,102	9-1	1,012	9-9
1929	950	10-5	1,132	8-8	1,028	9-7
1930	1,018	9-8	1,219	8-1	1,106	9-0
1931	1,096	9-1	1,254	8-0	1,165	8-6
1932	1,129	8-6	1,277	7-8	1,211	8-3

TABLE IV.
Cancer—Deaths in Age Groups 40 years and over.—Australia, 1932. Proportion of Cancer Deaths to Total Deaths in Age Groups.

Age Group.	Males.		Females.		All Persons.	
	Cancer Deaths.	Proportion of Cancer Deaths to Total Deaths.	Cancer Deaths.	Proportion of Cancer Deaths to Total Deaths.	Cancer Deaths.	Proportion of Cancer Deaths to Total Deaths.
40 to 44 years ..	94	1 in— 12-7	179	1 in— 5-1	273	1 in— 7-8
45 to 49 years ..	170	8-8	261	4-4	431	6-1
50 to 54 years ..	238	8-0	353	3-8	599	5-5
55 to 59 years ..	398	5-6	371	3-9	769	4-8
60 to 64 years ..	553	5-2	411	4-8	964	5-0
65 to 69 years ..	684	5-3	465	5-5	1,149	5-4
70 to 74 years ..	677	5-5	407	6-7	1,084	6-0
75 to 79 years ..	443	7-1	277	9-0	720	7-9
80 to 84 years ..	172	11-7	181	10-0	353	10-9
85 years and over	99	11-6	88	21-0	187	17-1
Unspecified ..	1	..	..	..	1	..
Total all ages over 40 years ..	3,527	1 in 6-8	2,992	1 in 6-1	6,519	1 in 6-4

comparatively late ages. It would be noted that in middle age, when most diseases were not taking a heavy toll of life, cancer was steadily taking heavy toll, and the proportion of cancer deaths to total deaths was at its highest in these age groups. Cancer was the principal cause of death in middle age in females. In males it came second only to the diseases of the heart and circulation as a cause of death in middle age.

The steady rise in the cancer mortality rate mainly appeared in relation to carcinoma of various organs. This was indicated in Table V. The mortality rate from sarcoma, though it fluctuated, had no pronounced upward tendency. The rate today was little different to that of twenty-four years ago.

Table V was not a true index of the mortality rate in the several groups indicated. Death certificates were now more accurately filled in and many deaths which formerly were specified merely as "cancer" or "malignant disease", "neoplasm" *et cetera*, were now more accurately placed by medical practitioners under the headings of carcinoma, epithelioma *et cetera*. Epithelioma was a term which was less used than formerly, being merely epithelial carcinoma, and consequently the apparent absence of increase in the mortality rate under this heading might be accounted for by a transfer on the part of certifying medical practitioners to the carcinoma column.

Turning to mortality rates in regional cancer, Dr. Holmes referred first to cancer of the tongue. He said that

TABLE V.
Death Rate of Definitely Recorded Types of Cancer per 100,000 of Mean Population—Australia, 1908–1932.

Year.	Carcinoma, including Scirrhus.			Epithelioma.			Sarcoma.		
	Males.	Females.	Total Persons.	Males.	Females.	Total Persons.	Males.	Females.	Total Persons.
1908	23.6	28.8	26.1	5.3	1.4	3.5	4.8	5.0	4.8
1913	33.0	35.7	34.4	4.8	2.0	3.5	5.2	4.3	4.8
1918	42.8	41.3	42.3	7.3	2.2	4.7	6.0	5.1	4.0
1923	49.5	51.7	50.5	5.5	2.2	3.9	5.9	3.8	4.9
1928	64.1	66.0	65.0	4.9	1.5	3.3	4.4	4.2	4.3
1929	69.2	69.7	69.5	4.4	1.8	3.1	6.5	3.9	5.2
1930	65.8	70.3	68.3	4.6	2.0	3.3	5.0	4.5	4.6
1931	75.6	73.3	74.5	5.7	2.3	4.0	5.4	4.9	5.2
1932	77.8	75.8	76.8	5.1	2.2	3.7	6.3	4.1	5.2

TABLE VI.
Cancer of the Tongue, Australia, 1908–1932.—Deaths per 100,000 of Mean Population.

Year.	Males.		Females.		Persons.	
	Deaths per 100,000 of Mean Population.	Ratio, Tongue to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Tongue to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Tongue to all Forms of Cancer.
1908	3.9	1 in—17	0.2	1 in—373	2.2	1 in—32
1913	3.8	20	0.2	347	1.8	41
1918	3.8	24	0.3	251	2.0	42
1923	3.3	28	0.3	314	1.8	49
1928	3.5	27	0.3	361	2.0	49
1929	2.7	29	0.4	211	2.0	45
1930	2.7	35	0.3	363	1.5	62
1931	3.4	31	0.5	194	2.0	51
1932	2.9	36	0.3	289	1.6	62

the mortality rate for cancer of the tongue, both in males and females, showed fluctuations within moderate limits. Nevertheless, in males the tendency was towards a diminution in the mortality rate for cancer in this situation (see Table VI). In females the tendency was rather in the reverse direction.

Table VII showed that the mortality rate from cancer of the female genital organs had risen steadily; the rise for 1931 had been maintained in 1932.

TABLE VII.
Cancer of Female Genital Organs, Australia, 1908–1932.—Deaths per 100,000 of Mean Population.

Year.	Death per 100,000 of Mean Population.	Ratio, Female Genital Organs to all Forms of Cancer.
1908	15.3	1 in—4.6
1913	15.2	4.8
1918	15.8	4.9
1923	16.8	5.2
1928	18.1	5.2
1929	18.7	5.1
1930	17.9	5.2
1931	20.9	4.7
1932	20.9	4.7

The rise in the mortality rate from cancer of the breast in females had been pronounced, there having been an increase of 82% in the past twenty-four years (Table VIII), as compared with an increase of 36% in the mortality rate from cancer of the female genital organs.

Dr. Holmes said that Table IX indicated a very heavy rise in the mortality rates. Among males an increase of 143% had occurred in the past twenty-four years, and among females 42%.

Although the cancer mortality rate in most regions had been steadily increasing, exceptions being noted in the case of cancer of the tongue and cancer of the skin in males (see Tables VII and XI), the rate of increase had

been much more marked in some sites than in others. The region in which the most rapid increase had occurred was the digestive tract (œsophagus to rectum) (Table X). Here the increase since 198 in males had been 120%, and in females 80%. In males in 1932, 50% of all deaths from cancer had been attributed to cancer of the digestive tract. The percentage in females was 38. These figures referred to the digestive tract alone and did not include liver, pancreas, mesentery or peritoneum.

TABLE VIII.
Cancer of Female Breast, Australia, 1908–1932.—Deaths per 100,000 of Mean Population.

Year.	Deaths per 100,000 of Mean Population.	Ratio, Female Breast to all Forms of Cancer.
1908	10.2	1 in—6.9
1913	10.7	6.8
1918	11.1	7.0
1923	15.3	5.7
1928	16.2	5.8
1929	17.1	5.6
1930	16.5	5.7
1931	18.6	5.2
1932	18.5	5.3

In cancer of the skin the mortality rate which, until 1918 in males, rose steadily, had since shown a distinct tendency to fall. Closer attention to accurate diagnosis and more effective treatment might be credited with this result.

Among the other tables prepared by Dr. Holmes was one (Table XII) in which were summarized the results of treatment with radium and radium combined with other methods in the special treatment centres.

Case Records and Statistical Returns.

In introducing the subject of case records and statistical returns Dr. Holmes said that in connexion with the question of case sheets and statistical returns the Fourth

TABLE IX.
Cancer of Rectum and Anus, Australia, 1908-1932.—Deaths per 100,000 of Mean Population.

Year.	Males.		Females.		Persons.	
	Deaths per 100,000 of Mean Population.	Ratio, Rectum and Anus to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Rectum and Anus to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Rectum and Anus to all Forms of Cancer.
		1 in—		1 in—		1 in—
1908	2.1	31	2.6	27	2.4	29
1913	3.0	25	2.9	25	2.9	25
1918	3.6	26	2.1	37	2.8	30
1923	3.6	25	3.2	27	3.4	26
1928	5.2	19	3.5	27	4.4	22
1929	4.5	23	3.3	29	3.9	25
1930	4.4	22	3.7	25	4.1	23
1931	5.1	21	3.6	27	4.3	23
1932	5.1	21	3.7	26	4.4	24

TABLE X.
Cancer of the Digestive Tract (Esophagus, Stomach, Intestines, Rectum and Anus), Australia, 1908-1932.

Year.	Males.		Females.		Persons.	
	Deaths per 100,000 of Mean Population.	Ratio, Cancer of Digestive Tract to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Cancer of Digestive Tract to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Cancer of Digestive Tract to all Forms of Cancer.
		1 in—		1 in—		1 in—
1908	25.2	2.6	20.1	3.5	22.8	3.0
1913	31.7	2.4	22.7	3.2	27.4	2.7
1918	41.4	2.2	25.2	3.1	33.2	2.5
1923	43.2	2.1	30.0	2.9	36.7	2.4
1928	50.0	1.9	36.3	2.6	43.2	2.2
1929	51.4	2.0	34.3	2.8	43.1	2.3
1930	49.7	1.9	35.9	2.6	42.9	2.2
1931	52.5	2.0	34.2	2.8	43.5	2.3
1932	55.3	2.0	36.7	2.7	46.2	2.3

TABLE XI.
Cancer of Skin, Australia, 1908-1932.—Deaths per 100,000 of Mean Population.

Year.	Males.		Females.		Persons.	
	Deaths per 100,000 of Mean Population.	Ratio, Cancer of Skin to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Cancer of Skin to all Forms of Cancer.	Deaths per 100,000 of Mean Population.	Ratio, Cancer of Skin to all Forms of Cancer.
		1 in—		1 in—		1 in—
1908	3.1	22	0.9	80	2.0	34
1913	3.4	23	1.9	39	2.6	25
1918	5.0	18	2.0	38	3.5	24
1923	4.6	20	2.2	40	3.4	26
1928	4.4	29	2.0	48	2.7	36
1929	3.8	27	2.4	40	3.1	32
1930	4.0	24	2.1	45	3.0	31
1931	3.5	30	1.6	61	2.6	39
1932	4.1	27	2.5	40	3.3	31

TABLE XII.
Summary of Results of Treatment with Radium and Radium combined with other Methods in the Special Treatment Centres in Australia.
Period since treatment was given: one to five years.

Cancer Group.	Clinical Character.	Total Cases Treated.	Apparently Cured.		Local Improvement.		Not Improved (Alive).		Died of Cancer.		No Information.	
			Cols. 1 and 2.		Cols. 3, 4, 5 and 6.		Col. 7.		Cols. 8, 9 and 10.		Col. 11.	
			Number.	Per-centage.	Number.	Per-centage.	Number.	Per-centage.	Number.	Per-centage.	Number.	Per-centage.
Sarcoma, 230	Operable ..	58	29	50	16	28	1	2.0	13	23.0	3	5
	Borderline ..	37	14	38	17	46	1	2.0	6	17.0	3	8
	Inoperable ..	78	12	15	33	42	3	4.0	41	53.0	5	6
	Very advanced	57	8	14	19	33	1	2.0	39	69.0	1	2
Carcinomata, 6,442	Operable ..	3,071	1,918	62	680	22	24	1.0	129	4.0	380	12
	Borderline ..	927	350	41	388	42	10	1.0	161	17.0	77	8
	Inoperable ..	1,576	327	21	612	39	49	3.0	700	44.0	140	9
	Very advanced	868	80	9	291	34	59	7.0	554	64.0	38	4
Malignant Disease, Various (Rodent Ulcer), 4,730	Operable ..	4,205	3,246	77	509	12	17	0.4	26	0.6	417	10
	Borderline ..	191	101	53	74	38	1	0.5	6	3.0	12	7
	Inoperable ..	269	106	40	95	36	10	4.0	54	20.0	24	9
	Very advanced	65	21	32	22	34	3	5.0	22	34.0	1	1

Australian Cancer Conference appointed a permanent committee to consider suggestions for amendment to these forms.

The various treatment centres had expressed themselves as satisfied with the case sheets as at present issued by the Commonwealth Department of Health and with the schedules for recording radium and X ray treatment. No suggestions had been received for amendment of these case sheets.

As regards statistical returns of results of treatment, many hospitals were making provision to extend their follow-up systems to embrace cases treated by surgical and other methods not involving the use of radium. It was proposed, therefore, in place of the forms previously used, to adopt a single printed form applicable to treatment by any method. A space would be left for the insertion of the particular method of treatment and a separate form would be used for each method of treatment employed.

A suggestion had been made that the form should be divided into two parts, one relating to the result of treatment of the primary lesion, the other to the result of treatment of the secondaries. This, of course, presented difficulties in many situations of cancer and involved additional tabulation and compilation. Members of the conference were invited to offer suggestions for the improvement and simplification of these forms, and also for amendment of the index of classification which had been in use for some years.

In making any suggestions it should be kept in mind that the compilation of the statistical material involved an immense amount of work on the part of hospital staffs and also of the officer who consolidated the information received from treatment centres. It was important, therefore, that the information which treatment centres were asked to include in the forms should be fully justified by its practical value. The conference was therefore asked to express an opinion as to the practical value of the information appearing in the consolidated tables prepared and to offer any suggestions as to future compilations.

Dr. Holmes suggested that for next year cancer of the breast be taken and a compilation made separately for five-year cases, four-year cases, and three-year cases in respect of each method of treatment for which end results had been ascertained. The number of five-year cases might not be very large, but it would be large enough to be worth while.

The treatment centres had devoted a great deal of effort towards the development of a very efficient system for following up the end results of treatment. This effort would be largely wasted unless the information gained was properly tabulated and made available to clinicians. General impressions as to results obtained were not reliable. The President of the British Empire Cancer Campaign had said in his presidential address at the last annual meeting:

Careful recording of all cases of cancer that have been treated, including the following up of such cases to ascertain their subsequent history, is considered a very important branch of research.

The compilation of the data was necessary if progress was to be made and scientific accuracy attained. The point was to decide just what the data should consist in. Treatment centres should be asked to record and compile only what was really worth while. Any criticism of the compilation made and any suggestions for the future would be welcomed. The conference could either adopt them or refer them to the permanent committee for consideration and report.

After discussion the matter was referred to the Permanent Committee on Case Records and Statistical Returns for report.

At a later stage the Permanent Committee on Case Records and Statistical Returns presented the following report:

In accordance with the desire of the conference, this committee has met to consider suggestions made by the members of the conference regarding the material to be dissected out of the case records for tabulation purposes,

and regarding the form in which the statistical tabulations covering the results obtained in the treatment of cancer shall be presented for the information of treatment centres and of the next cancer conference.

The committee wishes to point out that in the time at its disposal it has not been able to consider the matter in full detail or to come to a conclusion on all the points involved, but it makes the following recommendations and asks the conference to leave in its hands the working out of the details of the actual forms to be used and the scope of the compilations.

The committee recommends:

1. That there should be, as heretofore, a general compilation of all cases treated with radium and radium combined with other methods. Although this compilation has no real scientific value, it serves (a) as an indication of the use made of the radium, (b) to indicate roughly the proportion between survival and death of cases treated, (c) to indicate the extent of the success of the follow-up system. This is the only general compilation which the treatment centres will be asked to prepare.

2. That for each annual conference a special region of cancer be selected for detailed compilation of statistics of results of treatment: (i) That for the next annual conference the region selected be the breast, and that a detailed compilation be made by all Australian treatment centres of the treatment of cancer of the breast by various methods. (ii) That separate tables be prepared: (a) for cases of cancer of the breast in which a period of five years, four years and three years respectively has elapsed since treatment; (b) for each method of treatment employed; (c) for results of treatment (i) of primary tumours of the breast, (ii) of recurrences and of metastases. The more favourable results obtained in the treatment of the primary tumours should be clearly indicated and consequently must be separated from the less favourable figures regarding results obtained in the treatment of recurrences and metastases.

3. That for the purposes of compilation cancer of the breast be classified into four stages, each of these stages to be clearly defined for the information of surgeons and radiologists. This definition will be supplied either before or at the time the request for compilation of statistical material is sent out to treatment centres.

4. That a simplified compilation be made in respect of the cases in which a period of less than three years has elapsed since treatment.

5. That the compilations be prepared by treatment centres in time to permit all the material being consolidated for the whole Commonwealth, and for the consolidated tables to be made available to treatment centres and to authors of papers well in advance of the next conference.

6. That the Royal Australasian College of Surgeons be asked to arrange, if possible: (a) For the efficient following up of cases of cancer treated by surgical methods, so that information regarding end results may be available and for compilation of records along uniform lines. (b) For the compilation, on the same forms as are used by the cancer treatment centres, of the results of treatment of cancer of the breast by surgical methods; these compilations to follow the lines indicated in paragraphs 2, 3 and 4 of this report of the permanent committee. (c) to make the results available not later than the end of November, 1934.

7. That the principal hospitals be similarly requested to compile and supply figures relating to the results of treatment of cancer of the breast by surgical methods.

This report was presented to the conference at its final session and was approved by the conference.

Laboratory Research in New Zealand.

Professor E. F. D'Ath, of the University of Otago, New Zealand, read a review of laboratory research work carried out in New Zealand. The review had been prepared for the conference by Dr. A. M. Begg, Director of Cancer Research, New Zealand Branch of the British Empire Cancer Campaign. Dr. Begg outlined work carried out in connexion with the virus hypothesis and indicated

that so far no direct evidence had been found of an infective organism in mammalian tumours. In the field of chemical studies efforts had been directed towards ascertaining whether or not tumours differed from normal tissues in ferment content. The Bendien diagnostic technique had been subjected to prolonged investigation, but in the case of human serum the test proved most erratic. Work had also been carried out on the subject of hereditary predisposition to cancer, and in the therapeutic field investigation had been made of the lipolytic power of the blood of cancerous animals and the beneficial results of soap injections.

Special Aspects of Research.

At this stage four papers on special aspects of research were read.

The Taking of Biopsies.

A paper by Dr. Ellnor Hunt was read. This paper, dealing with the technique of taking a biopsy in relation to the modification of the life span of a tumour-bearing animal, was published in THE MEDICAL JOURNAL OF AUSTRALIA of May 26, 1934.

Homogeneous X Radiation and the Allantoic Membrane of the Chick.

Dr. Warnford Moppett read a paper on the significance of results obtained by exposing the allantoic membrane of the chick to homogeneous X radiation.

Dr. Moppett pointed out that certain theories of the action of X radiation on living cells might be tested only by exposure to homogeneous X radiation and this could be obtained with the X ray spectrometer. The allantoic membrane of the chick was the only tissue to be adapted to this instrument, and results showed a series of frequencies which had a maximal action. This phenomenon might be related to various numbers of *quanta* required, or alternatively, to the characteristic energy levels of certain heavy atoms present. Results indicated that the atom primarily affected was in some key position by which it might exert a profound influence on a large attached molecule. Possibly this molecule was part of the hereditary mechanism in the nucleus. If these results could be extended to other tissues they would add precision to the application of radiation. This was particularly required in the case of tumours where cure was dependent on a number of factors, of which the reaction of the stroma was very important.

In the discussion which followed, Professor D. A. Welsh said that the reactions of the tissues to cancerous invasions and to irradiation by X ray and by radium had been studied by him and by the pathologists of the Sydney University Cancer Research Fund at the radium clinic, and their earlier work had been published some years ago in *The Journal of the Cancer Research Committee of the University of Sydney*. Their results had shown that, whether these reactions arose naturally or were induced artificially by irradiation, four different types of reaction could be distinguished: (i) inflammatory (irritational), (ii) defensive, (iii) symbiotic, and (iv) neoplastic. It would also be correct to say that these types represented reactions of the stroma, natural or artificial, occurring separately or in various combinations. Obviously the most important in radiotherapy was the defensive reaction of the stroma, and the importance of "timing" the development of this defensive stroma reaction by regulating the dosage of radiant energy was specifically stressed in those earlier publications.

Professor T. H. Laby said that it could not be considered that the case for selective action was established. Dr. Moppett's paper was highly speculative and many years of research would be required to answer the questions raised.

Dr. C. E. Eddy discussed the difficulties of the application of irradiation to tumours below the surface. Although homogeneous radiation might be applied at the skin surface the wave length varied after passing through the tissues, so that the value of the radiation at a depth below the surface was not known.

Sensitizers and Their Influence in Chemical Reactions produced by X and Gamma Radiation.

Dr. G. Harker read a paper on the influence of sensitizers in chemical reactions produced by X radiation and γ radiation. He said that the important part played by various sensitizing agents in many photochemical reactions was well known. The best examples, perhaps, were provided in the field of photography. It had long been known that silver halides possessed increased sensitivity to light in the presence of gelatine, but it was only recently that the cause of this had been traced to minute quantities of organic isothiocyanates. These were usually present in the gelatine in the proportion of one part in 300,000. Further, a plate could be made not only more sensitive to a given intensity of radiation, but sensitive also to specific wave-lengths. In the case of infra-red photography the effect was achieved by introducing specific dyestuffs into the emulsion. The quantities of dyestuffs used were quite small, and in one case the proportion of dyestuff molecules to silver halide molecules was only 1 in 367,000. Turning from chemical decomposition by light to that by X and γ radiation, attention had first been drawn to the subject of sensitizers during the course of an investigation on the decomposition of chloroform by γ radiation. Chloroform was decomposed with liberation of chlorine with slowly disappeared with formation of hydrochloric acid as a secondary product, the decomposition being measured by estimating the chlorine set free. Certain discrepancies in the results were largely explained when it was found that the apparent rate of decomposition was greatly affected by the presence of the products formed.

Iron was an important constituent of many biological catalysts. Investigation showed that the rate of air oxidation of solutions of various ferrous salts was materially increased by γ radiation. Working with ferrous oxalate, experiments had been carried out to find to what extent, if any, the action of the radiation could be modified by the addition of small amounts of various chemical substances to the solutions. Some of the substances were found to increase the rate of oxidation in the presence of radiation, others lowered the rate.

Attention was turned to compounds of sulphur, many of which were known to be photochemically active. Striking results with sensitizers had been obtained with solutions of potassium metabisulphate. A solution of this salt slowly became oxidized in air, and the rate of oxidation was found to be considerably increased by subjecting the solution to γ radiation from radon. The addition of small amounts of iodine enormously increased the rate of oxidation, so much so that a trace of iodine (only $\frac{1}{10000}$ part of the amount required to oxidize all the salt in the solution) accelerated the rate three or four times. Equivalent amounts of potassium bisulphate and potassium iodide produced the same effect.

Glutathione was a sulphur-containing tripeptide of great importance in tissue metabolism. Some of this substance had been prepared from yeast by Hopkins's method and on testing was found to be radio-sensitive, in that in solution its rate of air oxidation was appreciably raised by γ radiation. It was to be expected that the reaction could be sensitized by appropriate agents, but neither iodine nor potassium iodate had this effect.

Crabtree and Cramer, in recent communications dealing with the action of radium on cancer cells, had shown that the susceptibility of cells to radium was not a fixed property of a given type of cancer cell, but changed with the environment. The effect of certain well known inhibitors of metabolism had been shown to produce varying sensibility to radium in tumour cells. Prussic acid and low temperature greatly increased the susceptibility of tumour tissue to radium; anaerobiosis produced the opposite effect. The glycolytic inhibitors, iodoacetic acid and sodium fluoride had little or no effect on the action of radium. As a result of their experiments Crabtree and Cramer suggest that it might be possible to increase the radio-sensitivity of cells by introducing suitable chemical substances. The results obtained in the laboratory by Dr. Harker appeared to lend force to this suggestion by showing that reactions fostered by γ (and X) radiations

could be sensitized by small additions of chemical bodies in an analogous manner to the action of sensitizers in many well known photochemical reactions.

Cancer of the Lip and Associated Glands.

Dr. H. S. Stacy read a paper on the rôle of surgery in carcinoma of the buccal cavity. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of June 2, 1934.

Dr. E. M. Fisher read a paper on an analysis of cases of epithelioma of the lip. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of June 2, 1934.

Dr. E. H. Molesworth read a paper on cancer of the lip, with particular reference to treatment by X rays. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of June 9, 1934.

Dr. L. M. McKillop read a paper on cancer of the lip and associated glands. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of June 2, 1934.

Dr. I. B. Jose and Dr. H. A. McCoy read a paper on cancer of the lip and associated glands. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of June 2, 1934.

In the absence of Dr. A. M. Welsh through illness, Professor D. A. Welsh read on his behalf a paper dealing with the reactions of the lymph nodes in the drainage area of primary carcinoma. It is hoped that this paper will be published in THE MEDICAL JOURNAL OF AUSTRALIA.

Pathological Classification of Cancer and Medical Certification of Death.

At the Fourth Cancer Conference the difficulties associated with the pathological classification of cancer were discussed, and Professor D. A. Welsh prepared for that conference a systematic classification of newgrowths.

As there are many difficulties in obtaining from certifying medical officers detailed information on the certificate of death regarding the pathological classification of cancer deaths, and even regarding the site of the tumour, it was suggested: (i) that there should be a classification of cancer under a minimum number of headings for the use of certifying medical practitioners in connexion with the certification of deaths and for demography purposes; (ii) that there should be a detailed pathological classification of newgrowths for use in the pathological departments of hospitals.

The Fourth Cancer Conference appointed a committee consisting of Professor D. A. Welsh, Dr. F. P. Sandes, and Dr. M. J. Holmes to go into the matter and make recommendations to this conference. This committee had unfortunately been unable to meet as a committee, but had prepared a fairly simple classification for use in the medical certification of deaths.

Professor Welsh introduced the classification to the conference and explained it. The classification was as follows:

A. Malignant newgrowth (type not specified and not included in the following).

B. Carcinoma—

- (1) Carcinoma.
- (2) Adeno-carcinoma.
- (3) Scirrhus carcinoma.
- (4) Paget's disease of nipple and breast.
- (5) Squamous carcinoma (epithelioma).
- (6) Basal-celled carcinoma (rodent ulcer).
- (7) Colloid carcinoma (colloid cancer).
- (8) Embryonal undifferentiated carcinoma.

C. Sarcoma—

- (1) Sarcoma.
- (2) Osteogenic sarcoma.
- (3) Giant-celled sarcoma of bone.
- (4) Fibro-sarcoma.
- (5) Myxo-sarcoma.
- (6) Myo-sarcoma.
- (7) Neuro-fibrosarcoma.

- D. Melanoma.
- E. Endothelioma.
- F. Glioma (gliosarcoma).
- G. Lymphosarcoma (lymphocytoma *et cetera*).
- H. Myeloma—
 - Chloroma.
 - Plasmacytoma.
- I. Embryonic tumours—
 - Hypernephroma.
 - Teratoma and embryoma.
 - Chorio-epithelioma (carcinoma).

Dr. R. D. Wright, after indicating some desirable amendments in the list, said that for the use of certifying medical practitioners he considered that the list should be much simplified. He moved that it be referred back to the committee for reconsideration in consultation with the Commonwealth Statistician.

Professor E. F. D'Ath said that general practitioners could not use the classification except with the assistance of *post mortem* examination.

Dr. T. Cherry supported the motion, which was then put to the conference and carried.

Professor Welsh pointed out that one of the three members of the committee was away from Australia, and the conference then appointed Dr. R. D. Wright and Professor E. F. D'Ath as additional members of the committee.

In connexion with the certification of deaths from cancer, Dr. Holmes gave a *résumé* of a paper by Professor J. Burton Cleland on clinical diagnosis and *post mortem* findings in malignant disease. This paper is published in this issue at page 65.

Dr. Holmes said that Professor Cleland's paper supported the view that without *post mortem* examination medical practitioners could not be expected to furnish much in the way of pathological information in the death certificate. The simpler the pathological classification of cancer for their use, the better. For the gathering of accurate information regarding the pathological nature of tumours and the relative incidence of pathological varieties, the pathological departments of hospitals should be relied on. This emphasized the necessity for the organized provision of definite pathological services to coordinate and supplement the work of the pathological departments of the large hospitals and of the university with a view to the solution of problems related to the spread of cancer in the body, the actual changes in normal and malignant tissues caused by radiation, the problems of necrosis, and a more exact knowledge of types of cancer and degrees of malignancy. This, of course, indicated definitely ordered *post mortem* investigations, macroscopic and microscopic, and coordination from a single centre which should be based on the pathological department of a university.

He said that it was interesting to note in Professor Cleland's paper that the number of cases in which malignant disease was present, but was not diagnosed, practically balanced those in which malignant disease was absent although diagnosed. Consequently they might infer that in the matter of total cancer deaths occurring in the community the medical certificates of death gave a reliable index.

Post-Graduate Teaching.

Dr. Holmes said that, as indicated to the Fourth Cancer Conference, the University of Sydney had established a diploma in radiology, the complete course to extend over one university year of three terms. It had been decided that the courses for the diploma should be given only when the number of candidates was sufficient to make them self-supporting. Last year a sufficient number of candidates had not been obtained and the courses were not given.

During last year the University of Melbourne had decided to establish two diplomas at that university, one in therapeutic radiology and electricity, the other in diagnostic radiology. Candidates had to be bachelors of medicine and surgery of at least two years' standing. The courses covered a full university year. A syllabus containing full details of subjects had been adopted.

The provision of these diplomas gave the opportunity of obtaining within Australia qualifications equal to any available outside the Commonwealth.

Dr. Holmes went on to say that in addition to the provision of diploma courses a further provision was most desirable. The developments which were taking place in the application of electricity and radiation treatment to the cure of human ailments were so rapid that even the holders of diplomas in therapeutic radiology and electricity required opportunity to keep abreast of them. It was suggested that the universities or other authorities concerned be asked to arrange for a post-graduate course in cancer annually or, if that was not possible, at least every second year, when the whole subject would be traversed from the point of view of developments in the preventive aspects, diagnosis, prognosis and treatment.

The suggestion was approved by the conference, which passed a resolution recommending to the authorities in each State the value and desirability of conducting from time to time post-graduate courses in cancer.

Protection.

In introducing the subject of protection, Dr. Holmes said that the Second Australian Cancer Conference appointed a special committee to report on matters relating to the protection of personnel exposed to radium and X rays. This committee had made recommendations which were adopted by the conference and had since been put into practice. The international recommendations regarding protection were strictly conformed to by treatment centres. Blood tests of staff were carried out at intervals of from one to three months. The dose of exposure to radiations was determined by the use of photographic films worn by personnel for specified periods and sent to the Commonwealth Radium Laboratory for standardized development and measurement. These tests had indicated no damage to health of personnel and the dose received by personnel handling radium was in all cases much below the tolerance dose. As regards X ray workers, in some instances at least the protection appeared to be less adequate.

A warning notice prepared by the Protection Committee and adopted by the Fourth Australian Cancer Conference had been printed in the form of a wall sheet by the Commonwealth Department of Health and distributed to treatment centres.

Inspection of X ray equipment from the point of view of adequate protection had been arranged in many cases. Special precautions were taken in the storage and handling of radium in accordance with the recommendations made in a pamphlet prepared in conjunction with the Protection Committee and printed and distributed by the Commonwealth Department of Health.

It would be seen that careful attention had been paid to this important matter of protection. Experience showed, however, that more care was required in respect of X ray workers. It was suggested that the warning notice be supplemented by a short pamphlet containing more detailed advice.

As regards diagnostic X ray workers, to whom little attention had been paid from the point of view of protection, it was suggested that a set of instructions be drawn up and printed for distribution.

A paper by Mr. A. H. Turner, Physicist-in-Charge of the Commonwealth Radium Laboratory, on protection in association with high voltage X ray equipment, was circulated amongst members. Mr. Turner showed that though the international recommendations might have been complied with, it was still desirable to insure that protection was adequate.

Mr. G. Bourne read a paper in which he reported investigations carried out at Perth Hospital. For a period of over two years blood counts had been made of workers in the radiological department. In one instance only had effects attributable to irradiation been noted. A nurse had manifested a white cell count of 20,000 per cubic millimetre within a week of starting work in the radiology department and this fell gradually until she left the department. A count six months later showed her white cells to be still at a high figure. Aubertin quoted a

similar case. Contrary to Piney's finding, eosinophilia was rare and appeared only in one doubtful case during the two years.

Of nineteen nurses examined during the two years, eleven showed a definite and progressive drop in the leucocytes after the first week in the department, and in the case of seven nurses gradual rises in the leucocytes took place. This variation was attributed to the fact that some nurses came immediately in intimate contact with the radium work, and in others the contact was more gradual. The chief features of the blood counts of the staff as a whole were a slight polycythemia and a moderate to high leucocytosis. The reaction to irradiation appeared to express itself firstly as a leucocytosis, secondly as a polycythemia, and then, thirdly, the white cells tended to fall to a leucopenic condition, which might be regarded as a danger signal. If irradiation was continued, the red cells tended to drop also to a low figure. There was a tendency for the haemoglobin, and thus the colour index, to be low in all these counts.

The conclusions of the two years' work were that:

1. Generally speaking, the protection measures were ample to prevent serious damage to the blood of workers in radiology departments, provided the international recommendations were adhered to.
2. That even when the recommendations were faithfully followed, blood changes did occur, indicating that protection was not perfect.
3. The large majority of workers in radiology departments were able to withstand the irradiation they received, but care should be taken to insure that no unduly radio-sensitive person was allowed to work in the department.
4. It was strongly recommended that at least weekly counts should be conducted for approximately a month on persons commencing work in radiology departments for the first time, and that persons exhibiting too great an initial reaction should be early eliminated from the staff of the department.

Mr. Bourne also read a paper by himself and Dr. A. H. Merrett on the protection of patients.

He said that blood counts of cancer patients undergoing deep therapy treatment had been conducted before and after each treatment. A series of counts in a cancer patient not undergoing deep therapy treatment, and a number of counts in fracture cases were also made, these last serving as controls. The conclusions reached as a result of this work were, firstly, that the initial effect of deep therapy irradiation on the blood of a cancer patient was, generally speaking, a fall in the red cells and a marked rise or fall in the white cells. Although the red cells might fall to a rather low figure, it never became a dangerous fall in the patients examined, and in every case it was found that, whether the treatment was continued or not, the red cells recovered from their drop and rose to a figure nearer to normal. Thirdly, the leucocytes varied very much, sometimes falling and sometimes rising with no constancy, but never reaching a very high or very low figure. In all the cancer patients examined, including one who was not undergoing irradiation, the leucocyte curve was a function of the absolute polymorphonuclear cell curve. In one case the leucocyte curve was a function of the absolute lymphocyte curve.

Dr. P. Parkinson asked for information in the matter of adequate screenage of buildings in which high voltage X ray equipment is operated.

Dr. E. W. Frecker said that with the most modern equipment it did not seem necessary to spend large sums of money in the heavy lead screening of buildings.

Professor T. H. Laby referred to the dangers of electrocution if metallic lead were used in walls and floors. Barium sulphate bricks were preferable, and floors could be covered with heavy rubber. Dr. C. E. Eddy also spoke against the use of metallic lead for the screening of walls and floors.

Mr. E. R. B. Pike drew attention to the fact that the State Insurance Company, Queensland, would not cover X ray workers in the same way as other workers.

Dr. A. T. Nisbet said that insurance companies in New South Wales placed no difficulties in the way of insuring X ray workers.

Dr. V. McDowall recommended that the question of insurance be referred to the Protection Committee for any desirable action.

Dr. P. C. Fenwick suggested that explicit information should be collected regarding deaths or damage from the use of X rays, and that the public should be informed just why the costly instalment of protection measures was necessary.

It was resolved:

That the Protection Committee be asked to prepare a statement containing detailed advice regarding the protection of workers using therapeutic or diagnostic X ray installations.

Screenage.

Dr. Holmes outlined the recommendations of the Fourth Cancer Conference in regard to screenage and indicated the action taken by the Commonwealth Department of Health in giving effect to these recommendations.

He said that the Commonwealth Government had provided a sum of approximately £3,000 to enable subdivision and remounting of certain radium to be carried out in accordance with the recommendations of the conference. It had been necessary to send the radium abroad for this purpose, but it would shortly be returned to Australia and available for distribution.

In the discussion which followed, representatives of several of the treatment centres indicated their desires in connexion with the distribution of the reconditioned radium when it was returned to Australia.

Dr. Cumpston said that when the distribution was made the claims of the various centres would receive very careful consideration. Allocation would be made in such a way that the radium would be placed where it was most needed.

Mild Radium Therapy.

At the Fourth Cancer Conference consideration was given to the introduction into Australia for commercial purposes of materials and apparatus containing or said to contain radium, and designed for use by the public in self treatment. These materials and apparatus included radium emanators for use in charging water with radium for drinking purposes or for making radium baths, radium pads for external application, and radium pills and injections for internal use. The Fourth Conference passed a resolution expressing the opinion that the admission into Australia of apparatus and preparations for use in so-called mild radium therapy would be inimical to the treatment of cancer and to the health of the community.

Dr. Holmes said that the Commonwealth Department of Health had taken the matter up with the Department of Trade and Customs, and the present position was that these products could be imported only by medical men for use in their practice, and then only when the special permission of the Minister was obtained in each case. Where the Customs Department came across any instance of attempt to import these products the matter was referred to the Commonwealth Department of Health for advice regarding action. The importation of these materials and apparatus might therefore be considered as being effectively controlled.

On hearing this statement of action taken the conference was of opinion that no further action was at present required.

International Cooperation.

International Investigation of Cancer of the Cervix Uteri.

In introducing the subject of the international investigation of cancer of the uterine cervix, Dr. Holmes said that, as stated at the Fourth Conference, the Radiological Subcommission of the Cancer Commission of the Health Organization, League of Nations, was endeavouring to ascertain what methods of radiological treatment gave

the best results in cancer of the *cervix uteri*, and to do so by a cooperative system of research. The help of gynecologists in various countries had been solicited.

A number of gynecologists in Sydney, Melbourne and Perth were cooperating in this international investigation. The investigation was being carried out according to the rules laid down by the Radiological Subcommission, and full particulars were being recorded on the international form adopted for the purpose. The patients were to be followed up for a period of years and history subsequent to treatment was to be fully recorded. An interval of at least three years would be allowed after treatment before results were assessed by the Radiological Subcommission, but arrangements had been made for an *interim* report of the gynecologists concerned to be sent to the Commonwealth Department of Health, including a return of the patients recorded on the international form.

At this stage a paper dealing with the results of treatment of cancer of the *cervix uteri*, by Dr. F. A. Maguire, was read in Dr. Maguire's absence by Dr. H. M. Moran. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of May 19, 1934.

An International Union against Cancer.

Attention was drawn to a communication received from the President of the first International Congress of the Scientific and Social Campaign against Cancer, which was held in Madrid in October, 1933. The President of the International Congress invited organizations in Australia to send representatives to a meeting to be held in Paris with the object of initiating an international union. The conference took no action in regard to representation in the international union.

British Empire Cancer Campaign.

Dr. F. S. Hone brought under notice correspondence received by branches of the British Empire Cancer Campaign in Australia in connexion with an Empire Day appeal by the British Empire Cancer Campaign for funds to carry on the work within the Empire. It was explained that it was proposed that funds collected for this purpose within Australia should be used to carry on the work in Australia.

Mr. E. R. B. Pike said that it was understood that any funds collected in Australia in connexion with this appeal would be used to carry on the work within Australia. He said that in connexion with the Empire Day appeal an address would be given by Lord Moynihan which was to be broadcasted in Great Britain. He suggested that it would be very helpful if arrangements could be made for this address to be picked up in Australia and broadcasted.

After some discussion the conference passed a resolution requesting the Commonwealth Department of Health to approach the Australian Broadcasting Commission, asking that arrangements be made for linking up with the British Broadcasting Corporation on the occasion of Lord Moynihan's address.

Institute of Radiology.

Dr. A. T. Nisbet informed the conference that steps were being taken to form an Australian and New Zealand Institute of Radiologists.

Federal Organization against Cancer.

At the Fourth Cancer Conference the subject of public education and the measures for the control of cancer were discussed. A committee of six was appointed "to consult with existing organizations with the object of drafting a scheme of federal organization". The committee consisted of Dr. H. M. Moran, Dr. E. S. Meyers, Dr. W. G. Cuscaden, Dr. F. S. Hone, Dr. Everett Atkinson, Dr. W. P. Holman. Dr. E. S. Meyers acted as secretary to the committee. It was explained that the committee had drawn up a report that was sent to the several members for signature. Only four members of the committee had signed the document. The report was circulated prior to the conference.

The following is the draft constitution for a federal organization as set out in the report.

Name: The Australian Cancer Campaign.

Object: To coordinate the activities of the Australian States in their campaign against cancer.

Organization: In inviting people interested in the campaign against cancer to form a federal organization, the Federal Government, through the Federal Health Department, shall undertake the organization and management of all Australian cancer conferences and of all bodies appointed to further the objective of the Australian Cancer Campaign.

The question of financial assistance shall be arranged by mutual agreement between the Federal Government and anti-cancer organizations cooperating with it.

President: The president of the organization shall be the Federal Minister of Health for the time being.

General Committee: To assist the Federal Director-General of Health in the organization of the Australian Cancer Campaign there shall be appointed each time an Australian cancer conference is held a general committee.

Members of this committee will be appointed on the recommendation of State anti-cancer organizations. Each such organization may appoint three (3) representatives to the general committee.

The Director-General of Health shall be an *ex officio* member of this and all other committees.

This committee will in no way interfere with the work of anti-cancer organizations in the various States, but it will be the duty of this committee to coordinate with the work of the Federal and State organizations.

Members of this committee may be composed of laymen and medical men.

Executive Committee: The general committee will, at the conclusion of each Australian cancer conference, appoint an executive committee. This committee will organize the work of the succeeding Australian cancer conference.

Membership: All members of State anti-cancer organizations shall, on application to the general committee, be appointed members of the Australian Cancer campaign. Members assembled in general meeting may appoint other persons to membership.

Members' Classification: Members shall be classified as:

I. Lay.

II. Professional: (a) Medical,
(b) Non-medical.

General Meetings: Members shall assemble in general meeting, to be known as the Australian Cancer Conference. Such meetings shall be held at such time and place as members assembled in general meeting determine.

Patrons: These shall be such distinguished persons as may accept the office on the invitation of the general committee.

Vice-Presidents: Such persons as the general committee decide shall be requested to accept the position of vice-presidents. These shall include the President of the British Medical Association for the time being in each State.

Secretary and Treasurer: An officer of the Federal Health Department shall, on the recommendation of the Director-General of Health, be appointed to act as secretary and treasurer to the federal organization. To assist him in his work he may, with the permission of the Director-General of Health, appoint other officers of the Commonwealth Health Department in the various States as assistant secretaries.

Liaison: The general committee shall appoint liaison officers in other countries in order that Australian workers may be kept abreast of current work.

Model Anti-Cancer Scheme: The general committee shall, as soon as possible, draw up a model plan of campaign against cancer.

In such a plan there shall be considered for submission to State organizations:

- (a) Number of anti-cancer centres recommended in each State.
- (b) Type of centre recommended.
- (c) Cooperation with general practitioners.
- (d) Cooperation with specialists (medical and scientific).
- (e) Cooperation with hospital authorities.
- (f) Regulations governing the supply of radium owned by the Commonwealth Government.
- (g) The codification of resolutions passed by previous Australian conferences.
- (h) Methods of prevention of cancer.
- (i) Education of the public.
- (j) The appointment of special committees to keep practitioners informed of the methods of treatment considered best.
- (k) The coordination of research in cancer in Australia.
- (l) The best methods of recording in regard to cancer.

Dr. H. M. Moran moved that the report of the Federal Organization Committee be adopted.

Dr. Holmes said that into the question of cancer organization came such important factors as the organized provision of definite necessary services to treatment institutions such, for example, as physical services and pathological services for the solution of the difficult problems of the therapists and for the promotion of research along lines of real practical utility. Such services could not be properly administered or financed unless there were a strong State organization bringing hospitals, universities, research centres, and all other institutions and organizations, including lay organizations, into close relationship and harmony. Cancer research would best flourish in such an atmosphere. Strong State organization should be the basis of any scheme of federal organization, which could function satisfactorily only by voluntary cooperation of the State organizations.

Mr. E. R. B. Pike moved:

That this Conference, realising the need for the cooperation of the public in its efforts to control cancer so that the educational and publicity work might be organized and carried on, asks the Government in those States where no such organization exists, to call a meeting of citizens so that a committee may be formed.

It further suggests that as a campaign is being launched by the British Empire Cancer Campaign on Empire Day the formation of these committees be associated with the appeal being made by that campaign.

That the Federal Government be asked to provide funds for the preliminary organization.

After considerable discussion it appeared that the conference was of opinion that the draft scheme recommended by the Federal Organization Committee, involving the functioning of a committee whose members would be widely separated in the several States, presented inherent difficulties in operation. No definite alternative scheme, however, was forthcoming. The Chairman then suggested that the conference should defer decision until members had had an opportunity of conferring among themselves at leisure. This was approved.

Upon resumption of the discussion on the following day, the Chairman (Dr. Cumpston) said that he thought that the form of organization most likely to be of value would arise from an active organization in each State

carrying out its own plans, but at the same time working in harmony with similar organizations in the other States. The annual cancer conference would serve as a bond of harmony, bringing the several State organizations into active contact and cooperation. He then submitted a series of proposals providing for the formation of an active organization in those States where such did not already exist, and for a deliberate review of the whole situation in Australia, setting out the principal immediate needs and their estimated cost, and indicating the best means of securing coordination or unity between the State organizations.

Dr. Cumpston made the following proposals:

1. This Conference, viewing the continued increase in cancer mortality with grave concern, considers that no organizations should be content with the success which has already been achieved, but should improve and extend their efforts and aim at definite progress towards an Australian organization.

2. The Conference considers that the most desirable form of organization to combat cancer is an association which will combine medical men and laymen on common ground for this common purpose in which all are equally and vitally interested.

Such an association should concern itself with every phase of the cancer problem, but should immediately devote special attention to: (i) providing the means of treatment, (ii) inducing sufferers to seek early diagnosis and treatment.

It therefore recommends to those States in which such an organization does not yet exist, that steps be taken as early as possible for its formation.

3. The Conference recommends to existing State organizations that:

(i) They take, during the next few months, any practicable steps to strengthen their personnel and influence so that they may command, rather than request, resources, both moral and material, adequate to the task they have undertaken.

(ii) They commence an immediate review of hospital accommodation, hospital equipment, clinic facilities, alliance with physicians, and all other units or auxiliaries in this campaign, presenting the results of this review at the next conference. This review should conclude with an estimate of the new services and equipment required in the light of our present knowledge, projected research, with its cost, and a full statement of immediate requirements.

4. The Conference requests the Commonwealth Government to assist in making this survey complete and uniform by making available an officer to visit each State during the coming year, to consult with the State organization, and render assistance in the formulation and preparation of the review.

5. The Conference suggests that, if this material is assembled in time, the Commonwealth Department of Health prepare from it for the next conference a general review of the position in Australia, setting out the principal immediate needs, a contemplated short-term programme and the estimated cost of each.

6. The Conference requests that this officer collect suggestions as to the directions in which coordination (or unity) between the various organizations is desirable and possible, and that this be presented with the statement contemplated by the preceding paragraph at the next conference.

7. That each State organization proceed immediately to the appointment of one person who shall cooperate with the Commonwealth officer throughout the year; and each State organization

will send to the next conference, in sufficient time before the conference starts, one of its delegates empowered to discuss all matters of policy arising out of the above review and prepare recommendations for the next conference.

8. In the meantime no effort should be spared in the development of the lines of activity already adopted—hospital treatment, radiotherapy, surgery, research, post-graduate courses, education propaganda—in short, the acquisition of new knowledge, the dissemination and application of knowledge already available.

After further discussion Dr. T. Cherry proposed that the Chairman's proposals be adopted. Mr. Pike withdrew his motion and seconded Dr. Cherry's motion, but said that he would suggest in regard to paragraph 7 of the Chairman's proposal that, if possible, the representative of each State organization and the Commonwealth representative should meet in Melbourne at the time of the meeting of the Royal Australasian College of Surgeons for the discussion of recommendations for the next conference.

Dr. Moran then withdrew his motion, and the only motion remaining was that of Dr. Cherry, which was put and carried unanimously. The Chairman's proposals, thus adopted, became a resolution of conference.

Radium and X Ray Necrosis.

Papers on radium and X ray necrosis were read by Dr. R. Kaye Scott, Dr. R. Douglas Wright, Dr. H. A. McCoy, and Dr. E. H. Molesworth. These papers were published in THE MEDICAL JOURNAL OF AUSTRALIA of July 7, 1934.

Professor D. A. Welsh gave a lantern demonstration of the microscopic changes found in X ray necrosis.

Considerable discussion took place, and it was apparent that in order to consider adequately the means of preventing necrosis much more definite information was required than was at present available regarding its incidence and the conditions under which it occurred, and also regarding the changes produced in the tissues.

It was agreed that during the forthcoming year the treatment centres should carefully observe and record the occurrence of radio-necrosis and supply for the next conference this information separately in its association with the use of radium, radon and X rays. In this way reliable information would be available as to the proportion of patients treated by various radiation methods who developed necrosis, and the conditions under which the necrosis appeared.

Dr. H. M. Moran agreed to prepare a schedule of items under which the information was to be collected, and Dr. R. Kaye Scott agreed to frame a scheme of necrosis research.

It was decided to ask the Universities of Sydney, Melbourne, and Adelaide to carry out or to continue definite investigational work on this subject during the year and to supply to the next conference a report as to progress. It was decided also to make radio-necrosis a principal matter for discussion at the next conference.

Arising out of the discussion on this subject the conference reiterated by resolution the opinion expressed at former conferences, that radium and radon should be used only by persons who had had special training in the use of these agents or under their direct supervision.

Radon.

Dr. Holmes said that, as indicated in the report of developments during 1933, radon was largely used for treatment purposes in Melbourne, to a very much less extent in Adelaide, and hardly at all elsewhere in Australia.

Radon, as issued from the Commonwealth Radium Laboratory in Melbourne and as applied at treatment centres in that city, possessed so many advantages in the treatment of cancer in various situations that its use was becoming increasingly popular where these advantages were known.

It was proposed under this item to indicate to the conference the methods of mounting radon which experience had proved the most valuable, and the particular advantages of its use with the techniques employed.

The standardization of production and issue of radon at the several radon centres was most desirable. Dr. Holmes went on to say that in accordance with a recommendation of the Fourth Cancer Conference the radium bromide which was being held in reserve at the Commonwealth Radium Laboratory for radon production, in connexion with an offer previously made to the Universities of Queensland and Western Australia, had now been definitely allocated for active use. The University of Western Australia had completed arrangements to set up a radon plant to supply the Perth Hospital with radon, and 300 milligrammes of radium bromide had been allocated to this university by the Commonwealth Department of Health. An additional quantity of approximately 100 milligrammes of radium bromide had been issued on loan to the University of Adelaide for increasing its output of radon. Of the remaining 200 milligrammes, portion was required at the Commonwealth Radium Laboratory to increase its output, and the remainder was at present in active and constant use in connexion with a definite piece of research, but would shortly be applied to the production of radon. Two hundred and fifty milligrammes of the mass treatment radium sulphate sent abroad for subdivision would be returned to Australia as radium bromide for use in radon production.

Mr. A. H. Turner read a paper in which he summarized the operations of the three Australian radon-producing centres. He also described the methods of purification and standardization of issue.

He pointed out in the course of his remarks that the use made of radon in Australia had so far not been very satisfactory. He added that the success of any radon service depended on the enthusiasm and cooperation of the radium therapists. He referred to the peculiar advantages possessed by radon, and entered a plea for their more general appreciation.

Dr. R. Kaye Scott read a paper on the general and special use of radon.

Dr. B. S. Hanson read a paper on experiences with radon at the Adelaide Hospital. This paper appears in this issue at page 71.

Dr. W. G. Cusaden read a paper on cavitary treatment with radon. This paper will be published in a subsequent issue.

X Ray Therapy.

At the Fourth Cancer Conference a discussion was held on the high cost of X ray equipment in Australia; the Commonwealth Department of Health was asked to take the matter up with the Tariff Board with a view to securing a reduction of customs duties.

It was pointed out that this was done and a meeting was arranged between the Tariff Board and Dr. Holmes, of the Commonwealth Department of Health, on two occasions. It was pointed out to the Tariff Board that rapid developments in X ray therapy necessitated the replacement of old equipment by new, and the increasing value of deep therapy treatment meant that many institutions which had not previously had deep therapy machines now felt it necessary to purchase them. The rising menace of cancer necessitated the use of every available means of treatment. Many machines were required, but if the costs were too high the treatment centres could not afford to instal them, or at least would have to defer installation.

The Tariff Board had received the arguments very sympathetically and promised that any action that could reasonably be taken to reduce costs in Australia would receive their careful consideration. The Tariff Board had to consider the standpoint of Australian industry and the fact that much of the equipment was manufactured locally.

The cost of Australian made machines was dependent upon the number of plants made here. If each machine

built in Australia had to be built as a special job, it would naturally cost considerably more than if a number of machines were being built to the same plan. Consequently the way to reduce costs of Australian made machines was to place orders in Australia. Here came in also the important question of service, for Australian made machines could be adequately serviced in Australia by the makers.

There was reason to believe that if a number of orders were placed for Australian made machines the cost could be reduced from 25% to 30%.

Another point was that the cost of imported machines in Australia was not the price in the country of origin plus freight, exchange, duty and landing charges. It was a price quoted by the agents, and if there was only one agent there was no competition to keep this price down. It would not follow that a reduction in duty would necessarily mean a reduction in price.

It would be seen that the matter involved very conflicting interests and difficulties. However, the Tariff Board had promised very careful and sympathetic consideration of the suggestions of the conference. It should be remembered that there was no duty on X ray tubes, valves, condensers and dosimeters.

Professor T. H. Laby read a paper on the need for a physical research service in relation to X ray and radium therapy. In order to show that there was a need for such a research service he referred to the experience gained at the Natural Philosophy Laboratory of the University of Melbourne. He pointed out that many inquiries had been and were being addressed to his laboratory by those engaged in X ray diagnosis, X ray therapy and the manufacture of X ray equipment. He gave details of some of the work undertaken. The position of the work was unsatisfactory in several ways. It made a heavy demand on the time of certain members of the laboratory and upon its experimental resources, while no provision for meeting these demands were made by a cancer or other medical fund. Professor Laby said that he sought the assistance of those interested so that, on the one hand, the fundamental research carried out in X ray physics might not have the precarious existence that it led at present, and, on the other, that definite provision might be made for applied X ray research in relation to X ray therapy and X ray equipment.

In the subsequent discussion it was suggested that portion of the duties collected by the Government on X ray equipment imported into Australia might reasonably be made available for the study of physical problems in connexion with the improvements in X ray equipment on which Australian manufacturers were working.

Dr. C. E. Eddy read a paper on recent developments in the production and measurement of X rays. In the course of his remarks he said that a method of generating constant high potentials of up to more than 2,000,000 volts had recently been developed and it was possible that, for the reasons of low first cost, few replacements, and high electrical and X ray efficiency, this might be adopted in the near future as a means of producing an X ray beam with a quality approaching that of a radium bomb. It should be emphasized that, with the development of transformers of tremendous size for very high tension operation, the parasitic currents which are required to charge the insulated conductors to a high potential each cycle become quite considerable. For this reason the use of electrostatic machines has been revived. Experiments had shown that currents of nearly 1 milliampere at 1,500,000 volts could be readily generated. The limit to the voltage possible was determined by the size of the spheres and the leakage loss along the insulator supports, which, of course, depended upon atmospheric conditions. Generators giving up to 700 kilovolts and more than 0.5 milliampere were priced at 2,700 dollars, and the X ray output of such a machine would be more than ample for therapeutic purposes, being equivalent in intensity to more than 40 grammes of radium. Such a high tension generator would have definite advantages, since it supplied a constant potential and, since there was very little capacity in the system, the risk of tube breakdown due

to sudden gas currents was considerably diminished. The future development and performance of these high voltage generators should be a matter of interest to physicist and therapist alike.

Dr. W. H. Love read a paper on the measurement of X ray dosage.

At the request of the Chairman, Dr. K. Stuart Cross gave an account of the organization and working of the X ray clinic with which he was connected.

Professor E. F. D'Ath described the action taken in New Zealand for the appointment of a physicist to the New Zealand Branch of the British Empire Cancer Campaign.

Dr. A. T. Nisbet gave a description of the deep X ray therapy equipment at Sydney Hospital. He also gave a demonstration of positioning the patient as carried out on the table used in the Sydney Hospital department.

Cancer of the Bladder and Prostate.

Dr. R. J. Silvertown read a paper on the use of radium in cancer of the bladder and prostate. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of June 16, 1934.

Dr. A. T. Nisbet read a paper on the treatment of carcinoma of the bladder and prostate by deep X radiation.

Cancer of the Ovary.

Dr. Constance D'Arcy read a paper by herself and Dr. Lella Keatinge on malignant tumours of the ovary. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of May 19, 1934.

In the absence of the author, Dr. H. M. Moran read a paper by Dr. F. A. Maguire in which thirty cases of malignant disease of the ovary were reviewed. This paper was published in THE MEDICAL JOURNAL OF AUSTRALIA of May 19, 1934.

Dr. W. G. Cuscaden read a paper in which he gave hospital statistics of ovarian cancer.

Future Conferences.

The Chairman asked members of the conference to bring forward any suggestions for improvement in the organization or procedure of future conferences. He said that the evolution of the conferences had resulted in the chief emphasis being placed on the administrative aspects and radiation therapy. Care must be taken that the conference did not become ill-balanced. The place of surgery must be kept in mind, so also must the point of view of the patient. He suggested that papers might be obtained from representative political men who could be invited to the conference for the purpose. Papers should be obtained also from general practitioners and from patients themselves so that these important aspects might receive the consideration due to them and the difficulties and problems of the general practitioner and of the patient be discussed and, as far as practicable, met. He suggested also that papers contributed to the conference would be shorter and more valuable if care were taken not to include in them things which everybody already knew, if repetition were avoided, and if authors kept to general principles as being of more value than reference to individual cases.

After discussion a resolution was adopted to the effect that the emphasis placed at the conference on the use of various forms of radiant energy in the treatment of cancer should not be allowed to produce the misconception that surgical treatment had been displaced from its established position.

Meeting Place of the Sixth Cancer Conference.

The meeting place of the next conference was then discussed.

Professor Welsh moved that the Sixth Australian Cancer Conference be held in Canberra. Dr. Constance D'Arcy seconded this motion, which was supported by Dr. T. F. Ryan.

Mr. Pike moved an amendment that the conference meet in one or other of the capital cities alternatively.

Dr. K. Stuart Cross, on instructions from the Victorian Branch of the British Medical Association, which he represented, seconded the amendment, but said that his personal experience of the conference had convinced him of the advantages of meeting in Canberra.

Dr. R. Kaye Scott, on instructions from the Melbourne Hospital, supported the amendment.

Dr. Cuscaden supported the motion, but suggested that some issues might be discussed at local conferences in other cities.

Dr. McKillop thought that a supplementary clinical conference might be held in other cities, and Dr. Clarence Read supported this suggestion.

Dr. H. M. Moran said that the Australian cancer conferences should be held in Canberra, but there was nothing to prevent the several State organizations arranging local conferences, which might be largely of a clinical nature. Such conferences could, if desired, be arranged at a time when the Commonwealth representative, Dr. Holmes, was visiting a State.

Upon the understanding that local arrangements would be made for the holding of supplementary conferences, Mr. Pike withdrew his amendment, and the motion of Professor Welsh, that the Sixth Australian Cancer Conference be held at Canberra, was put and carried.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on July 2, 1934.

The degree of Master of Surgery (Ch.M.) was conferred *in absentia* on Hessel George Howell, M.B. (Quirindi, New South Wales).

The Diploma in Public Health was awarded to Bruce Robson Overend, M.B., Ch.M.

The Senate resolved to tender its congratulations to the Honourable Sir David Ferguson, K.B., in connexion with the honour recently conferred upon him by His Majesty the King.

Messrs. Thompson and Bradfield (solicitors, Sydney) advised the Senate that under the will of the late Clarence Hudson Cooke, the University would receive, after certain life interests, the value of the estate for the foundation of scholarships.

The following appointment was approved: Dr. V. M. Trikojus as Lecturer in Organic Chemistry in the Department of Medicine.

Obituary.

JAMES FISHER ANDERSON.

JAMES FISHER ANDERSON, son of John Anderson, farmer, of Killylea, County Armagh, Ireland, was born at Killylea on November 20, 1850. As a boy he attended the Royal School, Armagh, and passed thence to Queen's College, Belfast, to study medicine. Here he received his instruction, but it was to Edinburgh that he went to qualify for his licentiate of the Royal College. After qualification he was resident medical officer at the General Hospital, Belfast, and was on the eve of sitting for his M.D. degree when the death of his father necessitated his return home.

For reasons of health he came to Australia in 1877 as ship's surgeon to the sailing ship *Melbourne*, and landed in Melbourne in October of that year. It had been his intention to return with the ship, but so impressed was he with the country and the opportunities it offered, that he

decided to stay, and the remainder of his life was spent here. He practised successively in Coleraine, Victoria, in 1877; at Urana, in New South Wales, in 1882; at Cootamundra, New South Wales, in 1886; at Longford, Tasmania, in 1894; and at Woodend, Victoria, in 1904.

After his retirement from active practice in 1921 he continued to reside at Woodend, and here it was that he died in May 24, 1934, aged eighty-three years. At the time of his death he was second only to one other in seniority on the Victorian Medical Register.

His time of active practice covered a period rich in medical progress. He would tell how one of his surgical instructors kept, for use in the operating theatre, an old frock-coat stiff with the blood and secretions of many years; and how the prognosis given for patients operated on in his student days was: "Gentlemen, almost all these will die." It was his lasting regret that he missed, by one short week, seeing the great Lister operate at Edinburgh.

Though he commenced his studies in these, to us, dim and dark ages, Anderson kept himself well abreast of the times and, whilst not forsaking the well-tryed remedies upon which experience had taught him to rely, he showed a wise discrimination in choosing and an eager readiness in trying any of the products of more modern research which appealed to him as likely to prove useful. Medicine was for him a vocation and as such he practised it. A saying frequently on his lips was: "Medicine is the most exalted profession, as it is the most sordid trade."

His patients were to him always individuals, never cases. He entered fully into their lives, shared their joys, participated in their sorrows, and thus became to each one of them, not only the skilled and tried medical attendant, but also the trusted confidant, the sagacious adviser, and the beloved friend. His professional work was always foremost in his mind, but his was a high ideal of citizenship, and his singleness of purpose, uprightness of character, fair-mindedness and utter lack of self-interest made his opinion highly respected and his influence widely felt throughout each district in which he practised.

He found relaxation in carpentry, for which he had no little aptitude, and music, and was a loyal and interested supporter of his church.

He married, in 1882, Margaret Gardner Simpson, younger daughter of the late Reverend Archibald Simpson, of Shelford, Victoria.

To his widow and his family, one daughter and two doctor sons, the medical profession extends its deep sympathy.

Dr. W. R. Groves writes:

I had the privilege of being the friend and junior colleague of Dr. Anderson for many years, in fact since he settled and made his home in Woodend, where his professional and public work was so much appreciated.

He was the type of practitioner who upholds the status of his profession—a conscientious worker, giving his constant and best attention to his patients, at the same time commanding, by his private life, universal respect. He was one of Nature's gentlemen, kindly, quaintly humorous, and with a keen sense of the fitness of things. Perhaps his most outstanding characteristic was his calm courage in the face of adversity. In his late years he was destined to experience and withstand a series of severe illnesses which might well have crushed the spirit of an ordinary mortal. About ten years ago he was considered to be in a hopeless condition, suffering from *angina pectoris*, when he astounded everyone by making a complete recovery. A little later he became afflicted with a severe generalized rheumatoid arthritis. He could hardly get about and could make very little use of his hands. Strange to say, and for no known reason, his condition gradually improved till he once more made an unexpected and complete recovery. Then he developed an urgent condition necessitating severe operative interference, undertaken with great trepidation. Once again he made a good recovery and subsequently enjoyed good health till his short and fatal illness some six years later.

One cannot think of such experiences at his great age without appreciating his wonderful spirit and fine character.

James Fisher Anderson will always be remembered as a splendid type of general practitioner and citizen; but those permitted to do so will perhaps best recollect him as they knew him in his home.

Dr. J. W. Dunbar Hooper writes:

I first met Dr. J. F. Anderson, who was then practising in Woodend, during a stay at Upper Macedon, nearly thirty years ago. Throughout the district he made a great name for himself by his kindness, tact and knowledge. Even after he underwent a big operation, which must have severely tried him, he continued his work, oblivious of bad weather and rough roads, ever ready to answer the call of sick folk and, whether or not it meant a fee, the patient was his first consideration.

One of his sons, Dr. Jock, whom I have known for many years, has distinguished himself in England, and the other, Dr. Archie, was a leading man at Ormond College and is well known here in our midst.

A confab with Dr. Anderson was always a real pleasure; he was alert, kept himself up to date in his knowledge, and his humour was a tonic; his sympathies were profound and illumined his whole life—a true example of the best traditions of our great profession.

Correspondence.

THE SURGICAL TREATMENT OF ASCITES.

SIR: In yours of June 2, 1934, appeared a subleader on the surgical treatment of ascites. You referred to the fact that omentopexies have not been permanently successful. An operation by Dr. F. C. Frazer is described. The latter admits that there is danger of intestinal obstruction from his operation, but that the outlook in intractable ascites is so hopeless that any risk is justifiable.

In the journal of November 29, 1924, I described an operation on the omentum for intractable ascites. The patient had thrombosis of the inferior *vena cava*. The abdomen filled up and had to be tapped every couple of weeks. The legs were likewise affected. The operation cleared up the ascites and the legs returned to normal. The secondary enlargement of the superficial veins took up the circulation. They were very visible at the back and at the sides and front of the abdomen.

I saw the patient recently. There has been no return of the fluid and the patient has been at his work as a shunter in the railway.

The case referred to proves that the operation is effective and permanent. The nature of the operation itself is such that there is no possibility of any obstruction resulting therefrom.

Yours, etc.,

D. P. O'BRIEN, M.B., F.R.C.S.I.

Rockhampton,
Queensland,
June 26, 1934.

"ACUTE RHEUMATISM" OR "RHEUMATIC FEVER".

SIR: It is surely time that in scientific writing at least we clear ourselves of that most gratuitous and imbecile of medical anachronisms—the use of the term "rheumatism" as covering every variety of arthritic disease, acute and chronic, to which a specific cause has not yet been assigned. No moth-eaten relic in the whole confused domain of nosology—"influenza" (*sic*) not excepted—is more productive to scientific obfuscation, clinical impotence and professional derogation than is found in the generic use of the term "rheumatic" to cover the omnium gatherum of diseases, ranging from rheumatoid arthritis

and spondylitis through "stiff neck", fibrositis and "rheumatics" to "back-ache" and malingering, which tradition, harking back to "humours", has identified with a "rheum". The confusion of rheumatic fever, in its various phases and consequences, with the contents of that dust-heap of tragedy, comedy and crime, seems to me not only unscientific, but obsolete.

Yet even in an article so interesting, able, and informative as the "Current Comment" ("Acute Rheumatism and the Kidneys") in your issue of July 7 we find the following: "The work described by Blaisdell [the systemic lesions of "acute rheumatism", especially as found in the kidney] is interesting in that it gives the clinician a wider view of acute rheumatism. When rheumatism is spoken of as an infective process it must be remembered that this conception of the disease has not been definitely shown to be correct." What "disease"? The fashion of the day supposes that each and all of the other kinds of "rheumatism" also derive from a "septic focus" of infection—where not from an infected mind. Should we not consolidate such gains as we have made? Rheumatic fever, though presenting still almost as difficult an aetiological problem as, shall we say, tuberculosis is, it seems to me sufficiently established as a clinical and pathological entity to justify deliberate distinction.

And for the rest I venture to suggest that, apart even from its appalling drain on the public purse and on national efficiency, the tragedy of chronic arthritis—so consistently and helpfully kept before us by Dr. Horace Fern—calls to us as a profession that we drop the pseudo-scientific verbiage with which we cover our ignorance, and thus compel ourselves in self-defence resolutely to face the problem of the aetiology, pathology and treatment of the various arthritic diseases and disabilities.

For my sins I have recently been compelled to "classify" intelligently, for statistical tabulation, these various conditions; your writer thus touched me on a raw spot. *Hanc illa lachrymæ.*

Yours, etc.,

A. G. BUTLER.

Duntroon,
Canberra,
Federal Capital Territory,
July 6, 1934.

TREATMENT OF CANCER OF THE LIP.

SIR: Dr. Aspinall, in a very kindly manner, has queried my suggestion that in cases of lip cancer without palpably involved glands dissection of the regional glands should be postponed until such involvement became apparent. This doctrine originated from Regaud's clinic at the Institut du Radium, Paris, as a result of observation of many hundreds of patients with cancer of the lip. It was found that only 20% of the cases without palpable glands subsequently showed involvement of the glands. We all know that in some cases of lip cancer, where the primary lesion is already comparatively advanced, glands are still not involved. When we come to deal with really early cases of all types of cancer which appear for treatment in increasing numbers as soon as the fear of a surgical operation is removed from the minds of the public, the proportion in which gland involvement is fated to occur will be found to diminish in corresponding ratio.

When Dr. Aspinall talks about safety first he does not appear to take all the factors of safety into account. The mortality resulting from operation to clear out the gland-bearing areas of the neck is a very important matter, and when all the sufferers from lip cancer are subjected to operation, the 80% who never would develop carcinoma in the regional glands are exposed to this risk as well as the 20% who are doomed to glandular recurrence. Therefore the total mortality from this operation becomes five times as great as it need be. This obviously greatly outbalances the questionable diminution of the chances of final recovery on the part of the small minority whose operation is delayed until the glands become palpable.

The fear of a mutilating operation upon the minds of patients has to be given full weight, as it undoubtedly makes many patients procrastinate in the hope that their fears as to the nature of the ailment may prove to be groundless. The effect of this on the ultimate death rate from cancer of the lip will be far more damaging than the short delay occasioned in 20% of the cases who will eventually require operation on the gland area.

The reference to the days of Sir Alexander MacCormick and Sir Herbert Maitland is not very happy, because in those times no distinction was drawn between squamous carcinoma of the skin, lip and tongue. Nor was anything known, or at least considered as evidence for or against dissection of regional glands, of the grades of malignancy of different forms of squamous carcinoma.

It may be said that tumours of Grade I in Broder's classification only involve glands late, and that Grade 4 of Broder's classification are never cured, whether gland dissection is carried out or not. There remain, therefore, Grades 2 and 3 in which the advisability of operation on the gland areas might be discussed. In Grade 3 it might be justifiable to dissect the gland areas even in early cases, but in Grade 2, when the primary growth is early, the justification of such a procedure is very questionable. In squamous carcinoma of the skin Grade 1 predominates enormously over the other varieties. In the lip Grade 1 is common, but Grades 2 and 3 are represented in diminishing proportion. In carcinoma of the tongue Grades 2 and 3 predominate, Grade 4 being not uncommon, but Grade 1 is exceptional. This is why in carcinoma of the tongue dissection of the regional gland area, whether involvement is apparent or not, still remains the order of the day.

Today, squamous carcinoma of the skin is never the sign for dissection of gland areas unless the glands are palpably involved; a carcinoma of the lip should be regarded only as a possible signal for such measures when Grade 3 is present—a comparative rarity. At any rate, the proof of the pudding is in the eating, and I can assure Dr. Aspinall that it eats well. Let him taste and try.

Again, if Dr. Aspinall's flattering references to my experience in the delivery of X ray treatment of cancer of the lip holds true, it is also true that the directions as to quality and quantity of radiation and the technique of the delivery of the treatment is so exactly laid down that anyone possessing a knowledge of the fundamentals of radiation therapy, a modern X ray plant, and efficient measuring gear can reproduce the dose recommended with an error of less than 5%. Moreover, there are very many fewer X ray plants in operation than there are scalpels. Therefore, the danger to be apprehended from X ray treatment in unskilled hands is small as compared with that of surgical measures employed in treatment of cancer of the lip. In other words, it is the lack of skill rather than the tool that is the source of danger.

I know how hard it is for surgeons who see only the occasional failures of radiation treatment to bring themselves to believe that surgical treatment of carcinoma of the primary lesions of the lip, tongue and *cervix uteri* is now supplanted. But both Dr. Aspinall and I can well remember that twenty years ago the treatment of even basal-celled carcinoma of the skin by radiation was stigmatised as being utterly unjustifiable. Now hardly 1% of skin carcinomata, basal- and squamous-celled, are treated surgically. As a result of this, the fear of operation being removed, nine out of ten patients apply for treatment early and are cured with a single application without any appreciable disfigurement or loss of time from work. It is an extreme rarity to see now the hideous destruction occasioned by advanced carcinomata laying bare the nasal cavity and sinuses, an event with which we were only too familiar in our student days. The reason is simple—the patients are without fear and come early for treatment. The supremacy of radiation treatment for carcinoma of the skin, to which it was earliest applied, is now admitted by all but surgical diehards. It is remarkable that though in Australia the incidence of skin cancer exceeds the incidence of cancer in all other parts of the body (50-1% of all cases, according to Dr. Bull, of the

Adelaide Cancer Centre—Cancer Conference, 1933), the mortality from cancer in this organ is negligible. There can be no gainsaying this fact, as shown by the Commonwealth cancer statistics. But Canute's chair must now be shifted higher up the strand—the tide is already rippling round its legs.

I sincerely hope that nobody will write and talk about the failures of radiation therapy which are on record while those of surgical failures are not. This is a private argument between my old friend Archie and myself. It is not free for all. Let anyone who has different views come to the next cancer conference at Canberra and air them. This matter of gland dissection in lip cancer was agreed upon, by the way, at the last conference, which comprised about eighty delegates from all States, all intensely interested in the problem of cancer.

Yours, etc.,

E. H. MOLESWORTH.

235, Macquarie Street,
Sydney,
July 11, 1934.

NOTICE.

THE Sydney University Medical Society will hold its annual ball at David Jones's ballroom on the evening of Wednesday, August 8, 1934. The President of the Ball Committee is Mrs. C. Bickerton Blackburn; the joint Honorary Secretaries, Mrs. R. Jeremy and Mr. W. J. Spence. Dancing will take place from nine o'clock. The price of the tickets is 7s. 6d.

Diary for the Month.

- JULY 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JULY 26.—South Australian Branch, B.M.A.: Branch.
JULY 26.—Victorian Branch, B.M.A.: Council.
JULY 26.—New South Wales Branch, B.M.A.: Branch.
JULY 27.—Queensland Branch, B.M.A.: Council.
AUG. 1.—Western Australian Branch, B.M.A.: Council.
AUG. 2.—South Australian Branch, B.M.A.: Council.
AUG. 2.—Victorian Branch, B.M.A.: Clinical Meeting.
AUG. 3.—Queensland Branch, B.M.A.: Branch.
AUG. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
AUG. 7.—Tasmanian Branch, B.M.A.: Council.
AUG. 8.—Victorian Branch, B.M.A.: Branch.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," pages xiii, xiv, and xv.

- AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Honorary Officers.
BRITISH MEDICAL ASSOCIATION, VICTORIAN BRANCH: Medical Secretary.
CANBERRA DISTRICT HOSPITAL, CANBERRA: Resident Medical Officer.
CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.
COAST HOSPITAL, SYDNEY, NEW SOUTH WALES: Junior Resident Medical Officer.
LEWISHAM HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Ophthalmic Surgeon.
MATER MISERICORDIÆ CHILDREN'S HOSPITAL, BRISBANE, QUEENSLAND: Resident Medical Officer.
MOUNT ISA MINES HOSPITAL, MOUNT ISA, QUEENSLAND: Junior Medical Officer.
RENEWICK HOSPITAL FOR INFANTS, SYDNEY, NEW SOUTH WALES: Honorary Anaesthetist.
ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Honorary Officers.
THE BROKEN HILL AND DISTRICT HOSPITAL, BROKEN HILL, NEW SOUTH WALES: Resident Medical Officers.
THE NEW SOUTH WALES COMMUNITY HOSPITAL (INCORPORATED), SYDNEY, NEW SOUTH WALES: Honorary Officers.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square London, W.C.1.

BRANCH	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla districts. Office of Health, District Council of Elliston. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £3 for Australia and £3 5s. abroad per annum payable in advance.